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Announcements & Index

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Announcements & Index

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 21 October 10, 1980

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* Committee on Scientific and Technical Information

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Subcategories: Components; Computer; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

Category 10. Energy Conversion (Non-propulsive)

Subcategories: Conversion Techniques; Power Sources; Energy Storage.

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Subcategories: Adhesives and Seals; Ceramics, Refractories,and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

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MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

PB-254 315/5GA PC **A16/MF A01** — Price codes
Smithsonian Science Information Exchange, Inc., Washington, D.C. — Corporate author
Information on International Research and Development Activities in the Field of Energy, David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678 — Personal author; Report title

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index. — Abstract of report

INDEX ENTRIES

Index entries are arranged alphanumerically. Titles are included in all indexes except the Contract Number index.

SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

Entries are sequenced by contract or grant number, corporate author, and NTIS order number.

ACCESSION/REPORT NUMBER

PB-254 315/5GI
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A PC **A16/MF A01**

Entries are sequenced by NTIS order, original report, or monitor agency number. Price codes are given in this index.

1. AERONAUTICS

1A. Aerodynamics

AD-A085 864/7 PC **A04/MF A01**
Royal Aircraft Establishment Farnborough (England)
On the Use in Stability Analysis of the Relationships between the Coefficients of a Quartic Equation and those of a Quadratic Factor.
Technical rept.,
H. H. B. M. Thomas. Jun 79, 63p RAE-TR-79065, DRIC-BR-70237

The stability of the perturbed longitudinal motion of an unaugmented aircraft about a given trimmed flight condition is determined by the well-known stability quartic. It is shown that two basic relationships exist between the coefficients of the quartic and those of a quadratic factor. It is possible to use the relationships to derive a further equation connecting the two coefficients of the quadratic factor as a single stability parameter is varied, all others being held constant. Examination of the position of the locus traced out by the point defined by the coefficients of the quadratic in relation to the axes and the parabolic boundary (separating real and complex roots) enables the trends in the nature of and the degree of stability of the mode or modes represented by the quadratic factor to be determined. The use of this (as far as is known, novel) method of analysing aircraft stability is illustrated by a number of examples. (Author)

AD-A086 079/1 PC **A08/MF A01**
Pennsylvania State Univ University Park Applied Research Lab
A Method of Correcting for the Effects of the Sidewall Boundary Layer in Two-Dimensional Airfoil Testing.
Technical memo.,
Paul P. Jacobs, Jr. 31 Mar 80, 156p Rept no. ARL/PSU/TM-80-44
Contract N00024-79-C-6043

This thesis presents the results of a hydrofoil force balance design study in which the influence of sidewall boundary layers on two-dimensional force measurements is emphasized. Past problems encountered with the present hydrofoil force balance at the Applied Research Laboratory of The Pennsylvania State University are reviewed in order to provide background information for the present study and a two-phase test program designed to identify those factors associated with the presence of sidewall boundary layers which can influence two-dimensional force measurement is water tunnels and wind tunnels is presented. (Author)

AD-A086 204/5 PC **A03/MF A01**
Illinois Inst of Tech Chicago Dept of Mechanics Mechanical and Aerospace Engineering
Dialogue on Bridging some GAPS in Stability and Transition Research,
Thorwald Herbert, and Mark V. Morkovin. Sep 79, 29p IIT-FLUID/HEAT TRANS-R79-13, AFOSR-TR-80-0471
Contract F49620-77-C-0013
Pub. in Proceedings of the IUTAM Symposium on Laminar Turbulent Transition, p1-26 Sep 79.

No abstract available.

N80-26266/0 PC **A04/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
A Computer Program to Generate Two-Dimensional Grids About Airfoils and Other Shapes by the Use of Poisson's Equation.
R. L. Sorenson. May 80, 62p NASA-TM-81198, A-8178

A method for generating two dimensional finite difference grids about airfoils and other shapes by the use of the Poisson differential equation is developed. The inhomogeneous terms are automatically chosen such that two important effects are imposed on the grid at both the inner and outer boundaries. The first effect is control of the spacing between mesh points along mesh lines intersecting the boundaries. The second effect is control of the angles with which mesh lines intersect the boundaries. A FORTRAN computer program has been written to use this method. A description of the program, a discussion of the control parameters, and a set of sample cases are included.

N80-26268/6 PC **A07/MF A01**
Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A Computer Program for Calculating Aerodynamic Characteristics of Low Aspect-Ratio Wings with Partial Leading-Edge Separation.
S. C. Mehrotra, and C. E. Lan. May 78, 132p NASA-CR-145362, CRINC-FRL-266-2
Grant NSG-1046

The necessary information for using a computer program to predict distributed and total aerodynamic characteristics for low aspect ratio wings with partial leading-edge separation is presented. The flow is assumed to be steady and inviscid. The wing boundary condition is formulated by the Quasi-Vortex-Lattice method. The leading edge separated vortices are represented by discrete free vortex elements which are aligned with the local velocity vector at midpoints to satisfy the force free condition. The wake behind the trailing edge is also force free. The flow tangency boundary condition is satisfied on the wing, including the leading and trailing edges. The program is restricted to delta wings with zero thickness and no camber. It is written in FORTRAN language and runs on CDC 6600 computer.

N80-26269/4 PC **A07/MF A01**
Aerospace Systems, Inc., Burlington, MA.
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, Production Version (Soussa-p 1.1). Volume 1: Theoretical Manual.
Final Report.
L. Morino. Jan 80, 134p NASA-CR-159130, ASI-TR-78-45-V-1
Contract NAS1-14977

Recent developments of the Green's function method and the computer program SOUSSA (Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics) are reviewed and summarized. Applying the Green's function method to the fully unsteady (transient) potential equation yields an integro-differential-delay equation. With spatial discretization by the finite-element method, this equation is approximated by a set of differential-delay equations in time. Time solution by Laplace transform yields a matrix relating the velocity potential to the normal wash. Premultiplying and postmultiplying by the matrices relating generalized forces to the potential and the normal wash to the generalized coordinates one obtains the matrix of the generalized aerodynamic forces. The frequency and mode-shape dependence of this matrix makes the program SOUSSA useful for multiple frequency and repeated mode-shape evaluations.

N80-26270/2 PC **A09/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
An Advanced Panel Method for Analysis of Arbitrary Configurations in Unsteady Subsonic Flow.
Contractor Report, Mar. 1976 - Feb. 1980.
A. R. Dusto, and M. A. Epton. Feb 80, 198p NASA-CR-152323, D6-48846
Contract NAS2-7729

An advanced method is presented for solving the linear integral equations for subsonic unsteady flow in three dimensions. The method is applicable to flows about arbitraty, nonplanar boundary surfaces undergoing small amplitude harmonic oscillations about their steady mean locations. The problem is formulated with a wake model wherein unsteady vorticity can be convected by the steady mean component of flow. The geometric location of the unsteady source and doublet distributions can be located on the actual surfaces of thick bodies in their steady mean locations. The method is an outgrowth of a recently developed steady flow panel method and employs the linear source and quadratic doublet splines of that method.

N80-26273/6 PC **A02/MF A01**
Weapons Systems Research Lab., Salisbury (Australia).
Improvements to the Nswc Aerodynamics Prediction Program of Particular Significance for Bombs.
Mar 80, 19p WSRL-0146-TR, AR-001-970

Deficiencies in the Naval Surface Weapons Center missile aerodynamics prediction program were found. Effective corrections were devised. The boattail normal force at subsonic and transonic speeds was given. Normal force results were large in magnitude when the base diameter was small. A correction for boattail center of pressure was included. Due to fuses and lugs on bombs, allowances were devised for truncated nose viscous separation pressure drag at subsonic and transonic speeds, and for excrescence drag at all speeds. An allowance was made for viscous separation drag at the nose shoulder, at transonic speeds. A correction was included to account for the wave drag due to large amounts of nose blunting, including the region near the drag rise Mach number.

N80-26275/1 PC **A07/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Works on Theory of Flapping Wing.
V. V. Golubev. Jun 80, 140p NASA-TM-75750
Contract NASW-3199
Transl. Into English from the Book "Trudy Po Teorii Mashushchego Kryla" Moscow, State Publishing House of Tech.-Theoret. Lit., 1957 p 399-569. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

It is shown mathematically that taking account of the boundary layer is the only way to develop a theory of flapping wings without violating the basic observations and mathematics of hydromechanics. A theory of thrust generation by flapping wings can be developed if the conventional downstream velocity discontinuity surface is replaced with the observed Karman type vortex streets behind a flapping wing. Experiments show that the direction of such vortices is the reverse of that of conventional Karman streets. The streets form by breakdown of the boundary layer. Detailed analysis of the movements of certain birds and insects during flight 'in place' is fully consistent with this theory of the lift, thrust and drag of flapping wings. Further directions for research into flight with flapping wings are indicated.

N80-26281/9 PC **A05/MF A01**
Bristol Univ. (England). Dept. of Aeronautical Engineering.
Aerodynamics in the Neighborhood of a Rotating Spoiler.
B.S. Thesis.
W. U. Leong, and I. Tsangoulis. Jun 79, 87p BU-232

The aerodynamic characteristics of a three dimensional spoiler with controllable rotary speed are investigated using three different flow visualization techniques and pressure measurements. Both vented and unvented spoilers with ratios of free stream speed to spoiler tip speeds of 126 or less were studied. Results indicate that the spoiler aerodynamic hinge force is directly related to the opening rate, but the maximum static force is related only to free stream speed. The size of a separation bubble behind the unvented spoiler also depended on opening rate, but was unrelated to free stream speed in the range tested.

N80-26282/7 PC **A03/MF A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Environmental and Applied Fluid Dynamics Dept.
Analytical Modeling of Mean Pressure Distribution around a Two-Dimensional Circular Cylinder at High Reynolds Numbers.
J. P. Borleteau, D. Livari, and A. Turi. Sep 79, 28p VKI-TN-134

Two analytical models which describe the mean flow pressure distribution around a two dimensional circular cylinder at high Reynolds numbers are presented. The first model reproduces the cylinder and the wake region using a conformal mapping technique, whereas the second model describes the cylinder and the wake boundaries by linear segments of distributed vorticity (panel method). Neither model considers the flow field within the

wake region. Only the external potential flow is studied. The input data for the two models, namely the base pressure and the position of the separation point, are provided by experimental results which are also compared with the computed pressure distribution. Both models lead to a computed pressure distribution which is generally in good agreement with the experimental data when considering a smooth cylinder. However, only the second model provides satisfactory matching in the case of cylinders with surface roughness where the boundary layer thickness has a strong influence on the location and the level of the peak suction as well as on the pressure rise which follows up to separation. The second model allows the boundary layer effects to be taken into account by adding to the geometrical shape of the cylinder the displacement thickness of the layer.

N80-26283/5 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
The Form of the Solutions of the Linear Integro-Differential Equations of Subsonic Aeroelasticity.
D. L. Woodcock. Sep 79, 48p RAE-TM-STRUCT-956, BR70935

The solution of the subsonic flutter problem, when the commonly used linear differential equation model is replaced by the more correct linear integro-differential equation model, is studied, and the nature of the system's free motion established. The different forms appropriate to two dimensional and three dimensional flow, and to the cases when the system has a zero characteristic value, are developed in detail. It is shown that, for large time t, the behavior can variously be like 1, 1/log t, 1/tsq, 1/tcu.

N80-26292/6 PC **A10**/MF **A01**
National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).
The Analytical Prediction of the Separation Behaviour of External Stores after Release from the Carrier Aircraft. Part 2: Applications.
G. J. Vandenbroek. Aug 79, 225p CSIR-NIAST-79/103-PT-2, ISBN-0-7988-1650-3

An analytical store separation prediction method was developed. The method is based on inviscid linear potential theory for subsonic and supersonic flow. The aircraft and external store are divided into a large number of panels, each of which contains an aerodynamic singularity distribution. Source and vortex distributions are used. The strengths of the singularities are determined and the store loads obtained. The store loads are combined with the six-degree-of-freedom equations of motion to provide the separation characteristics of the store. Various aspects of the computational method are investigated in considerable detail. Approximative schemes are studied to speed up the calculations, resulting in an economical separation prediction method. Extensive comparisons with experimental data regarding the various aspects of the computational method, are included. In general, satisfactory agreement is observed. Areas for improvement are defined

N80-26297/5 PC **A08**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
Experimental and Analytical Studies of a True Airspeed Sensor.
Final Report, period ending 29 Feb. 1980.
G. L. Goglia, and J. Y. Shen. Jun 80, 173p NASA-CR-163261
Grant NSG-1177

A true airspeed sensor having a flow phenomenon which is the vortex precession or the vortex whistle, no moving parts, and is independent of temperature, density, altitude, or humidity changes is proposed. The designed sensor consists basically of a vortex tube, a swirler, and a pickup system. When air passes through the swirler a precessional flow is generated at the region before and after the sudden enlargement area. An audible vortex whistle is generated, the signal picked up by the microphone, and the frequency response shown in a frequency counter. Measurements for both the closed conduit test and wind tunnel test are recorded. A computer is used to obtain the numerical solution. For a specific flow rate or airspeed, the larger the exit swirler angle, the greater the frequency response. For a smaller cross sectional area at a precessional flow region, the frequency response is higher. As the airspeed is increased the Strouhal number, dependent only on the exit angle of the swirler, remains constant.

N80-26621/6 PC **A03**/MF **A01**
Systems and Applied Sciences Corp., Hampton, VA.
Transition Prediction Using Three Dimensional Stability Analysis.
M. R. Malik. Jun 80, 31p NASA-CR-159277, R-SAL-6/80-01
Contract NAS1-15804

Several methods of transition prediction by linear stability analysis are compared. The spectral stability analysis code SALLY is used to analyze flows over laminar flow control wings. It is shown that transition by the envelope method and a new modified wave packet method are comparable in reliability but that the envelope method is more efficient computationally.

N80-26622/4 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Noise Reduction in a Mach 5 Wind Tunnel with a Rectangular Rod-Wall Sound Shield.
T. R. Creel, Jr., J. W. Keyes, and I. E. Beckwith. Jun 80, 82p NASA-TP-1672, L-13451

A rod wall sound shield was tested over a range of Reynolds numbers of 0.5 x 10 to the 7th power to 8.0 x 10 to the 7th power per meter. The model consisted of a rectangular array of longitudinal rods with boundary-layer suction through gaps between the rods. Suitable measurement techniques were used to determine properties of the flow and acoustic disturbance in the shield and transition in the rod boundary layers. Measurements indicated that for a Reynolds number of 1.5 x 10 to the 9th power the noise in the shielded region was significantly reduced, but only when the flow is mostly laminar on the rods. Actual nozzle input noise measured on the nozzle centerline before reflection at the shield walls was attenuated only slightly even when the rod boundary layer were laminar. At a lower Reynolds number, nozzle input noise at noise levels in the shield were still too high for application to a quiet tunnel. At Reynolds numbers above 2.0 x 10 the the 7th power per meter, measured noise levels were generally higher than nozzle input levels, probably due to transition in the rod boundary layers. The small attenuation of nozzle input noise at intermediate Reynolds numbers for laminar rod layers at the acoustic origins is apparently due to high frequencies of noise.

1B. Aeronautics

AD-A085 873/8 PC **A05**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
A Time Response Approach to Equivalent Aircraft Dynamics.
Interim rept. Oct 78-Sep 79,
J. M. Stifel. Sep 79, 85p Rept no. NADC-79231-60

An analytical investigation into the basic equivalent of high-order and reduced-order aircraft dynamics is presented. The need to consider system response to inputs represented by points in the Laplace domain is explained in terms of the ability of a damped sinusoid series to model general aperiodic pilot inputs. The region of concern in the Laplace domain is related to pilot response time by the time to the initial peak of a single damped sinusoid input. Several representative high-order systems and their lower order equivalents are examined for similarity of time response. A new approach for equivalent systems application is suggested based on matching time responses over the Laplace domain region. Implications of the analysis to present methods of applying equivalent systems and to suggested pilot compensation criteria are examined. The analysis leads to the conclusion that equivalent system parameters are variables dependent on Laplace domain location and that the success of current methods depend on that variation being negligible. The further conclusion is reached that if equivalent system parameters are allowed to vary, artificial time delays are unnecessary and undesirable in achieving time response similarity. (Author)

AD-A086 118/7 PC **A04**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
A Method for Administrative Assignment of Runway Slots.
Final rept.,
Kenneth E. Geisinger. Jun 80, 53p Rept no. FAA-AVP-80-5

Federal Aviation Regulations set quotas (upper limits) on the number of operations per hour at each four major U.S. air carrier airports: Washington National, New York LaGuardia, Chicago O'Hare International and New York Kennedy International. The reservation for one of these operations is referred to as a 'runway slot'. The runway slots designated for scheduled air carriers are periodically assigned to the various carriers in advance and airline schedules are built around them. How many slots each airline gets is determined by mutual agreement among the airlines through airline scheduling committees. These committees might be abolished and their function might have to be performed by the Federal Aviation Administration (FAA). This report presents a method for administratively assigning slots to the airlines. It is based on observations made of the scheduling committees. The major difference is that in the scheduling committees, decisions are made in order to get unanimous consent; in the administrative procedure, decisions are made to maximize a measure of passenger service. (Author)

N80-26285/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Preliminary Results of Simulated Vortex Encounters by a Twin-Engine, Commercial Aircraft During Final Landing Approach.
E. C. Hastings, Jr., G. T. Holbrook, and G. L. Keyser, Jr. May 80, 56p NASA-TM-81782

Piloted simulations of encounters with vortices of various ages and degrees of attenuation were performed with the Visual Motion Simulator. In the simulations, a twin engine, commercial transport on final approach, encountered the modeled vortices of a four engine, wide body, commercial transport. The data show the effect of vortex age and attenuation on the severity of the initial upset, as well as the effect of the vortex encounters on the landing capability.

N80-26391/6 PC **A06**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
An Assessment of the Risk Arising from Electrical Effects Associated with the Release of Carbon Fibers from General Aviation Aircraft Fires.
D. Rosenfield, and J. Fiksel. Feb 80, 104p NASA-CR-159206
Contract NAS1-15380

A Poisson type model was developed and exercised to estimate the risk of economic losses through 1993 due to potential electric effects of carbon fibers released from United States general aviation aircraft in the aftermath of a fire. Of the expected 354 annual general aviation aircraft accidents with fire projected for 1993, approximately 88 could involve carbon fibers. The average annual loss was estimated to be about $250 (1977 dollars) and the likelihood of exceeding $107,000 (1977 dollars) in annual loss in any one year was estimated to be at most one in ten thousand.

N80-26392/4 PC **A07**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
An Assessment of the Risk Arising from Electrical Effects Associated with Carbon Fibers Released from Commercial Aircraft Fires.
A. S. Kalelkar, J. Fiksel, D. Rosenfield, D. L. Richardson, and J. Hagopian. Feb 80, 144p NASA-CR-159205, C-81857
Contract NAS1-15380

The risks associated with electrical effects arising from carbon fibers released from commercial aviation aircraft fires were estimated for 1993. The expected annual losses were estimated to be about

$470 (1977 dollars) in 1993. The chances of total losses from electrical effects exceeding $100,000 (1977 dollars) in 1993 were established to be about one in ten thousand.

N80-26393/2 PC A08/MF A01
Operations Research, Inc., Silver Spring, MD.
Advanced Risk Assessment of the Effects of Graphite Fibers on Electronic and Electric Equipment.
L. Pocinki, M. Cornell, and L. Kaplan. May 80, 167p NASA-CR-159210
Contract NAS1-15379

An assessment of the risk associated with accidents involving aircraft with carbon fiber composite structural components is examined. The individual fiber segments cause electrical and electronic equipment to fail under certain operating conditions. A Monte Carlo simulation model was used to computer the risk. Aircraft accidents with fire, release of carbon fiber material, entrainment of carbon fibers in a smoke plume transport of fibers downwind, transfer of some fibers/into the the interior of buildings, failures of electrical and electronic equipment, and economic impact of failures are discussed. Risk profiles were prepared for individual airports and the Nation. The vulnerability of electrical transmission equipment to carbon fiber incursion and aircraft accident total costs is investigated.

N80-26394/0 PC A03/MF A01
Little (Arthur D.), Inc., Cambridge, MA.
As Assessment of Power System Vulnerability to Release of Carbon Fibers During Commercial Aviation Accidents.
G. R. Larocque. Jan 80, 41p NASA-CR-159208
Contract NAS1-15380

The vulnerability of a power distribution system in Bedford and Lexington, Massachusetts to power outages as a result of exposure to carbon fibers released in a commercial aviation accident in 1993 was examined. Possibie crash scenarios at Logan Airport based on current operational data and estimated carbon fiber usage levels were used to predict exposure levels and occurrence probabilities. The analysis predicts a mean time between carbon fiber induced power outages of 2300 years with an expected annual consequence of 0.7 persons losing power. In comparison to historical outage data for the system, this represents a 0.007% increase in outage rate and 0.07% increase in consequence.

1C. Aircraft

AD-A085 818/3 PC A04/MF A01
Ultrasystems Inc Irvine CA
Fluid Contamination of Aircraft-Cabin Air and Breathing Oxygen.
Final rept. 19 Jun 78-19 Jun 79,
K. L. Paciorek, J. H. Nakahara, and R. H. Kratzer. Dec 79, 53p SN-8331-F, SAM-TR-79-34
Contract F33615-78-C-0612

From different manufacturers, a series of lubricating oils (MIL-L-7808), hydraulic fluids (MIL-H-5606), and heat-transfer fluids (MIL-C-47220) were obtained to test their potential for contaminating aircraft breathing air and oxygen. No significant differences were detectable in the compositions of lubricating oils and hydraulic fluids, irrespective of the origin, including fluids recovered after service in an aircraft. The two heat-transfer fluids of interest were single compounds. Under normal operating conditions, the hydraulic and heat-transfer fluids afforded minimal quantities of products. The lubricating oils volatized to a large degree; the mists consisted essentially of unchanged starting materials. Tests simulating line rupture with fluid spilling onto a hot, 450 C (850 F), metal surface in the presence of air resulted in excessive fluid degradiation. In all instances, significant quantities of hydrocarbons, carbonyls, and alcohols were produced. Among these, the highly toxic formaldehyde, acrolein, formic acid, and formates were found and quantitated. (Author)

AD-A085 819/1 PC A02/MF A01
Army Research and Technology Labs Moffett Field CA
An Experimental Investigation of the Effects of Aeroelastic Couplings on Aeromechanical Stability of a Hingeless Rotor Helicopter,
William G. Bousman. 1980, 14p
Presented at the Annual Forum of the American Helicopter Society (36th) Washington, DC, May 80.

A 1.62-m diameter rotor model was used to investigate aeromechanical stability, and the results were compared to theory. Configurations tested included: (1) a nonmatched stiffness rotor as a baseline, (2) the baseline rotor with negative pitch-lag coupling, (3) the combination of negative pitch-lag and structural flap-lag coupling on the baseline rotor, (4) a matched stiffness rotor, and (5) a matched stiffness rotor with negative pitch-lag coupling. The measured lead-lag regrossing mode damping of the five configurations agreed well with theory, but only the matched stiffness case with negative pitch-lag coupling was able to stabilize the air resonance mode. Comparison of theory and experiment for the damping of the body modes showed significant differences that may be related to rotor inflow dynamics. (Author)

AD-A085 820/9 PC A03/MF A01
Dreyfus-Pellman Corp Stamford CT
Non-Contacting Electro-Optical Contouring of Helicopter Rotor Blades.
Final rept.,
Marc G. Dreyfus, and Arnold Pellman. Dec 79, 47p
Contract DAAK50-78-C-0024

Non-contact contour measurements of helicopter rotor blades to accuracies of 0.001 inch are possible via rangefinding by triangulation employing electro-optical techniques. A prototype of a portion of such a system has been built and tested. The result of these tests indicate that the construction of the full prototype system is feasible and desirable. (Author)

AD-A085 823/3 PC A08/MF A01
Parks Coll of Saint Louis Univ Cahokia IL
Critical Parts.
Final rept.,
Robert Boll, J. Thomas Harrington, John Kustura, Harold Sutphin, and Dennis Wacker. 12 May 80, 162p
Contract DAAJ01-77-A-0012

This study's objectives are (1) to develop the methodology for assessing Disassembly Inspection Reports and, (2) to identify those items/parts critical to flight safety.

AD-A085 844/9 PC A03/MF A01
Rockwell International Thousand Oaks CA Science Center
Mechanical Behavior of Airframe Materials.
Final rept. 1 Jan 76-31 Dec 79,
J. A. Wert, N. E. Paton, and J. C. Chesnutt. Mar 80, 47p SC5053.6FR, AFOSR-TR-80-0451
Contract F44620-76-C-0025

This is the final report for a program which was initiated in 1976 to systematically evaluate the influence of hydrogen on mechanical properties of alpha titanium alloys. In the second year of the program (1977), the effort was extended to include work on the properties of fine grain aluminum alloys. Both segments of the extended program have yielded promising results which are summarized in this report. Among the more important results have been a demonstration of high sustained-load cracking rates and an acceleration of fatigue crack propagation rates by tensile hold periods in Ti-6Al containing modest amounts of hydrogen. The study of fine grain aluminum alloys has demonstrated a marked increase in exfoliation corrosion resistance in 7075 Al with fine equiaxed grain, as compared to standard commercial products. Both of these observations have important implications for the structural efficiency of Ti and Al alloys as airframe materials. (Author)

AD-A085 854/8 PC A02/MF A01
Cost Analysis Improvement Group Washington DC
Aircraft Operating and Support Cost Development Guide.
15 Apr 80, 23p
Update to report dated May 74, AD-A001 747 and report dated Aug 77.

This document provides guidelines for preparing and presenting estimates of operating and support (O&S) costs to the OSD Cost Analysis Improvement Group (CAIG) and the Defense Systems Acquisition Review Council (DSARC). These guidelines are intended to achieve consistent and effective preparation and documentation of major system O&S cost estimates. This guide updates and expands the CAIG 'Cost Development Guide for Aircraft Systems' originally published in May 1974.

AD-A085 863/9 PC A11/MF A01
Royal Aircraft Establishment Farnborough (England)
Theoretical Determination of Subsonic Oscillatory Airforce Coefficients for Fin-Tailplane Configurations.
Technical rept.,
D. E. Davies. Sep 79, 239p RAE-TR-79125, DRIC-BR-72505

The fin-tailplane configuration consists of two flat half-tailplanes and a flat fin joined together so as to be symmetric about the plane of the fin. The half-tailplanes may be set at a non-zero dihedral angle to each other. The chords of all the surfaces at their junction are of the same length and are coincident. The fin-tailplane configuration is assumed to be isolated and to be oscillating harmonically about its mean position in a subsonic flow whose main stream is parallel to the junction chord. The oscillatory motion is taken to be antisymmetric about the plane of the fin. Linearized equations of potential flow are assumed to be valid so that the normal velocities on the fin and tailplane surfaces may be related to the loadings on these surfaces by means of linear integral equations. These integral equations are solved numerically for the loadings for oscillation at general frequency in any antisymmetric modes, and the generalised airforce coefficients are then obtained. Approximations to the loadings are taken as linear combinations of basis functions.

AD-A085 968/6 PC A04/MF A01
National Aeronautics and Space Administration Hampton VA Langley Research Center
Development and Validation of a Combined Rotor-Fuselage Induced Flow-Field Computational Method.
Technical paper,
Carl E. Freeman. Jun 80, 61p NASA-L-13363, NASA-TP-1656, USAAVRADCOM-TR-80-B-3

A potential-flow panel method has been modified to calculate the effects of a rotor wake on the time-averaged surface pressure and velocity distributions on a helicopter fuselage. The rotor-induced velocities are calculated by using a vortex-tube wake model. The calculated pressure distributions are found to compare well with experimental data obtained from tests of a wind-tunnel model. (Author)

AD-A086 005/6 PC A03/MF A01
Sage Action Inc Ithaca NY
Prediction of Aerodynamic Loads on Close-Coupled Canard Configurations - Theory and Experiment.
Final rept.,
R. W. Hale, P. Tan, and D. E. Ordway. Jul 77, 37p SAI-RR-7702, ONR-CR215-194-3F
Contract N00014-72-C-0200

The close-coupled canard configuration has emerged as an advanced design for highly-maneuverable fighter aircraft, achieving much of its lift at high angles of attack from vortex lift. This paper summarizes the progress to data on a comprehensive investigation to develop a simplified theory for the aerodynamic performance. Flow visualization tests on a 6 ft (1.83 m) semi-span model of a representative configuration are first discussed. These tests are followed by measurements on a 12 ft (3.66 m) full-span model to obtain force and moment data, as well as pressure data on the upper surface of the wing. With this understanding, the proper velocity/vorticity relationships on the wing and the burst vortex above the wing are found and a compatible mathematical model is formulated. The general solution to the potential flow problem is then given and the influence of conical parts of the burst vortex system is derived. Numerical results for these steps look very good. In conclusion,

the final steps in the development of the theory are outlined and a new mechanism for the vortex lift is identified. (Author)

AD-A086 009/8 PC **A15/MF A01**
Federal Aviation Administration Washington DC
Federal Aviation Administration Activites in the Agency's 50th Year. An In-Depth Report.
1980, 349p

What does FAA with its worldwide organization, its 58,000 employees and its $3 billion annual budget, accomplish in a given year. This report is an attempt to answer that question as fully as possible for a representative year-in this case, the agency's 50th. Its activities were chosen for in-depth examination for at least three principal reasons: first, because the year was an important landmark in the agency's history justifying such an examination; second, because the review would provide a valuable benchmark for measuring the accomplishments of future years; and third, because much of what the agency accomplished during the year was addressed to meeting the challenges of the 80's--the crucial eighth decade of the 20th century in which we now find ourselves. (Author)

AD-A086 042/9 PC **A02/MF A01**
Army Research and Technology Labs Moffett Field CA
A Critique of Handling Qualities Specifications for U.S. Military Helicopters,
David L. Key. 1980, 16p
Pub. in the AIAA Atmospheric Flight Mechanics Conference (7th) p1-15, 11 Aug 80, AIAA Paper no. 80-1592.

No abstract available.

AD-A086 046/0 PC **A03/MF A01**
Federal Aviation Administration Washington DC Office of Systems Engineering Management
Active BCAS Performance in a Garble Environment,
Edmund J. Koenke. 24 Jan 80, 50p Rept no. FAA-EM-80-1

A basic design tool has been developed which includes the principal BCAS design parameters, namely, transmitter power, receiver sensitivity, aircraft density, closure rate, degarble capability, and interrogation rate. This tool can be directly applied to the evaluation of alternative BCAS design concepts as well as for parametric design studies. Results of a comparison between an ATCRBS/DABS BCAS and an ATCRBS only BCAS are presented leaving little doubt concerning the performance advantage offered by the inclusion of the DABS link for evasive maneuver coordination. It must be emphasized that neither of the BCAS systems analyzed in this report are representative of the active BCAS defined in the draft National Standard for active BCAS. (Author)

AD-A086 126/0 PC **A06/MF A01**
Houston Univ TX Dept of Electrical Engineering
The Remote Link Unit: Applications to the Design-for-Repair Methodology Program.
Final rept. 15 Aug 79-15 Mar 80,
Carlos J. Tavora, and Miles A. Smither. Apr 80, 120p AFWAL-TR-80-1033
Contract F33615-78-C-1634

This represents the results of a study on the application of the Remote Link Unit (RLU) and its design concepts to the Design-for-Repair Methodology Program. The report focuses on the incorporation of automated maintenance and fault tolerance in avionic systems. The major components used to implement the proposed design concepts are intelligent universal interface modules and electronic nameplates. A phased implementation plan for the integration of RLU concepts in the design of distributed avionic systems is also described. (Author)

AD-A086 127/8 PC **A05/MF A01**
McDonnell Aircraft Co St Louis MO
The Effects of Ground Wall-Jet Characteristics on Fountain Upwash Flow Formation and Development.
Final technical rept. 15 Feb 79-15 Jun 80,
Donald R. Kotansky, and Lloyd W. Glaze. 15 Jun 80, 80p ONR-CR212-261-1F
Contract N00014-79-C-0130

An experimental program was conducted to investigate the effects of ground wall jet characteristics on two-jet fountain upwash flow formation and development. Variations in wall jet properties were generated through parametric variations in nozzle pressure ratio and jet impingement angle. Hot film anemometer measurements of the wall jet and fountain upwash flow fields resulted in the determination of fountain upwash formation momentum recovery coefficients, fountain upwash inclination and spreading characteristics, and fountain upwash mass entrainment characteristics. The data obtained in this investigation provides empirical information required for an analytical model of fountain inclination developed during this study. This analytical model is compatible with a methodology and software for the prediction of multiple jet V/STOL aircraft ground surface flow fields previously developed for the Naval Air Development Center and later modified for the NASA Ames Research Center. (Author)

AD-A086 188/0 PC **A04/MF A01**
National Aeronuatics and Space Administration Moffett Field CA Ames Research Center
Large-Scale Wind-Tunnel Tests of Inverting Flaps on a STOL Utility Aircraft Model.
Technical paper,
Terrell W. Feistel, and Joseph P. Morelli. Jun 80, 56p NASA-A-7061, NASA-TP-1696, USAAVRADCOM-TM-80-A-1

A unique inverting flap system has been investigated on a large-scale deflected slipstream model in the Ames 40- by 80-Foot Wind Tunnel. The subject tests utilized 33% chord double-slotted flaps on a low-aspect ratio wing that was fully immersed in the propeller slipstream. Evaluation of the flap effectiveness is aided by comparisons with the results of tests of other flap systems on the same twin propeller, twin tail boom STOL utility aircraft mode. No extreme or abrupt force or moment increments were encountered when the flaps were deflected through a wide range, corresponding to the complete retraction/extension spectrum. The lift and descent capability of the inverting flaps compared very favorably with that of the other flap systems that have been tested on this model, including some with much greater mechanical complexity. As expected, the flaps caused large nose-down pitching-moment increments at the high lift settings; however, the trimmed characteristics are still competitive with those obtained from the more complicated flap systems. It is believed that these flaps may have promising potential application to the design of relatively simple STOL utility aircraft with improved performance capabilities. In addition, they may merit consideration as retrofits to existing aircraft with less effective flap systems. (Author)

AD-A086 213/6 PC **A05/MF A01**
Boeing Aerospace Co Seattle WA
Diffraction Phase Loading of Structures.
Final rept. 24 Jan-31 Oct 78,
J. Etzwiler. 31 Oct 78, 86p DNA-4726F, AD-E300 818
Contract DNA001-78-C-0138

The response of the KC-135 and 747 aircraft to a nuclear gust were calculated using the VIBRA-4 code. Runs were made with and without diffraction phase loading to determine the effect on the aircraft response. The differences in the calculated ratios were small for the KC-135 model, but large differences were found with the 747 model. Clearly the diffraction phase can exert a large influence on the nuclear gust imposed loads, but it was not possible to predict this effect in advance. (Author)

AD-A086 241/7 PC **A02/MF A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Active Beacon Collision Avoidance System Test Bed for the 1978 Los Angeles Flights.
Rept. for Jul 76-Aug 78,
Maurice Cohen, and Charles Richardson. May 80, 17p Rept no. FAA-NA-79-12

This document describes the test bed configuration of the Federal Aviation Administration (FAA)/ air traffic control radar beacon system/Discrete Address Beacon System (ATCRBS/DABS) active mode beacon collision avoidance System (BCAS). BCAS is a ground-independent, air-to-air system activated by eliciting replies from surrounding altitude-reporting transponders within a 32-nautical mile radius. The BCAS provides a positive climb or dive command to the pilot 30 seconds prior to any possible collision. The BCAS also advises the pilot of all aircraft with marginally safe separation. Feasibility flight tests of the test bed configuration were conducted at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, N.J., Washington, D.C., and Los Angeles, California, from 1976 through 1978. The test bed included the multilevel power interrogation capability referred to as 'whisper-shout', intended to segregate responding aircraft transponders to distribute the computer processing workload and reduce garble. (Author)

N80-26267/8 PC **A05/MF A01**
Boeing Vertol Co., Philadelphia, PA.
Design and Analytical Study of a Rotor Airfoil.
Final Report.
L. U. Dadone. May 78, 93p NASA-CR-2988, D210-11239-1
Contract NAS1-14659

An airfoil section for use on helicopter rotor blades was defined and analyzed by means of potential flow/boundary layer interaction and viscous transonic flow methods to meet as closely as possible a set of advanced airfoil design objectives. The design efforts showed that the first priority objectives, including selected low speed pitching moment, maximum lift and drag divergence requirements can be met, though marginally. The maximum lift requirement at M = 0.5 and most of the profile drag objectives cannot be met without some compromise of at least one of the higher order priorities.

N80-26284/3 PC **A03/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Fuselage Ventilation Due to Wind Flow About a Postcrash Aircraft.
J. W. Stuart. 15 Jun 80, 26p NASA-CR-163273, JPL-PUB-80-36
Contract NAS7-100

Postcrash aircraft fuselage fire development, dependent on the internal and external fluid dynamics is discussed. The natural ventilation rate, a major factor in the internal flow patterns and fire development is reviewed. The flow about the fuselage as affected by the wind and external fire is studied. An analysis was performend which estimated the rates of ventilation produced by the wind for a limited idealized environmental configuration. The simulation utilizes the empirical pressure coefficient distribution of an infinite circular cylinder near a wall with its boundary later flow to represent the atmospheric boundary layer. The resulting maximum ventilation rate for two door size openings, with varying circumferential location in a common 10 mph wind was an order of magnitude greater than the forced ventilation specified in full scale fire testing. The parameter discussed are: (1) fuselage size and shape, (2) fuselage orientation and proximity to the ground, (3) fuselage-openings size and location, (4) wind speed and direction, and (5) induced flow of the external fire plume is recommended. The fire testing should be conducted to a maximum ventilation rate at least an order of magnitude greater than the inflight air conditioning rates.

N80-26293/4 PC **A06/MF A01**
Rockwell International Corp., Los Angeles, CA. Aircraft Div.
Design Studies of Laminar Flow Control (LFC) Wing Concepts Using Superplastics Forming and Diffusion Bonding (SPF/DB).
Final Report, Aug. 1978 - Sep. 1979.
V. E. Wilson. May 80, 114p NASA-CR-159220
Contract NAS1-15488

Alternate concepts and design approaches were developed for suction panels and techniques were defined for integrating these panel designs into a complete LFC 200R wing. The design concepts and approaches were analyzed to assure that they would meet the strength, stability, and internal volume requirements. Cost and weight comparisions of the concepts were also made. Problems of integrating the concepts into a complete aircraft

system were addressed. Methods for making splices both chordwise and spanwise, fuel light joints, and internal duct installations were developed. Manufacturing problems such as slot aligment, tapered slot spacing, production methods, and repair techniques were addressed. An assessment of the program was used to developed recommendations for additional research in the development of SPF/DB for LFC structure.

N80-26294/2 PC **A04/MF A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Evolution of Materials and Associated Technologies in Aerospace Material Structures Evolution des Materiaux et des Technologies Associees dans les Structures de Materials Aerospatiaux.
G. Sertour, and G. Hilaire. 30 May 79, 57p SNIAS-792-551-106
Text in French. Presented at 14TH Congr. Intern. Aeron., Paris, 6-8 Jun. 1979.

A brief history of developments is given. Specific topics examined include: propagation of fatigue cracks, stress corrosion, aluminum alloy forming processes, and composite materials. Selected applications are illustrated: tanks for the 1st stage of Ariane, structures of the Mirage 2000, Concorde and Airbus a 300B aircraft and Intelsat 5, Marecs antenna, a rigid solar generator, Ariane's double launching system, composite carbon-carbon materials with multidirectional armatures, and a Kevlar coil for a propulsion device.

N80-26327/0 PC **A07/MF A01**
Optimization Software, Inc., Los Angeles, CA.
Optimization and Simulation of Flight Control Laws under Parameter Uncertainty and External Disturbances.
Final Report.
1 Dec 79, 136p NASA-CR-163292
Contract NASW-3158

Several tasks pertinent to flight control in parameter uncertainty and wind-gust loading were successfully completed. Identification algorithms for extracting stability and control derivatives from flight data taking gust loading into account were developed. They were verified by simulation and evaluated throughly on actual flight data taken on a Lockheed Jet Star flying in turbulence. In particular the need for automatically generated dither-like inputs was studied. Criteria for performance evaluation using stochastic models were developed for gust alleviation as well as handling quantities. Algorithms for assessing degradation in performance due to parameter uncertainty were developed and evaluated using flight test data.

N80-26445/0 PC **A02/MF A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Use of the FISSAD Test Bar for Studies, Qualifications Control of Aeronautical Construction Materials Utilisation de l'Eprouvette FISSAD dans les Etudes, les Qualifications et les Controles de Produits Destines aux Constructions Aeronautiques.
J. Odorico, and E. Budillon. 6 Apr 79, 9p SNIAS-792-551-103
Text in French. Presented at Meeting Italien sur la Fissuration, Milan, 31 May 1979.

The heat treatments applied to 40 CDV 12 steel (used in the construction of AIRBUS) are described together with the steel's composition and the corresponding latitudes admissible. The required characteristics are stated. The effects of quenching (air, salt baths, oil) and austenizing on breaking energies and brittle/ductile transition curves are shown. The results of FISSAD on various grade steels, titanium alloys and some other light alloys are also given.

N80-26684/4 PC **A03/MF A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Accelerated and Natural Aging of Glued Assemblies Use in Aeronautics Vieillissement Accelere et Vieillissement Naturel d'Ensembles Colles Utilises dans l'Aeronautique.
G. Briens. 22 Aug 79, 27p SNIAS-792-551-107
Text in French. Presented at Forum Intern. Mater. Composites, Collage et Adhesion, Lyon, 11-14 Sep. 1979.

Conditions prevalent in tropical, equatorial, polar, and marine environments were simulated in order to determine the behavior and performance of thin film adhesives used to bond aluminum alloys in aircraft structures. The effects of humidity, surface treatment, and the nature of the adhesive were determined. Various types of shear stress tests were used. Variables included conditions of exposure (without loads, static loads, dynamic loads) and the ambient temperature of the humidity (50 C, 60 C, and 70 C.) Accelerated life tests conducted at 70 C with 100% humidity for 750 h, at 35 C with 5% NaCl for 750 h, and at 100 h in dry heat permitted the rapid elimination of adhesives with unsatisfactory performance.

N80-26697/6 PC **A06/MF A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Nonlinear Transient Analysis by Energy Minimization: A Theoretical Basis for the Action Computer Code.
M. P. Kamat. Jul 80, 109p NASA-CR-3287
Contracts NAS1-15080, NGR-47-004-14

The formulation basis for establishing the static or dynamic equilibrium configurations of finite element models of structures which may behave in the nonlinear range are provided. With both geometric and time independent material nonlinearities included, the development is restricted to simple one and two dimensional finite elements which are regarded as being the basic elements for modeling full aircraft-like structures under crash conditions. Representations of a rigid link and an impenetrable contact plane are added to the deformation model so that any number of nodes of the finite element model may be connected by a rigid link or may contact the plane. Equilibrium configurations are derived as the stationary conditions of a potential function of the generalized nodal variables of the model. Minimization of the nonlinear potential function is achieved by using the best current variable metric update formula for use in unconstrained minimization. Powell's conjugate gradient algorithm, which offers very low storage requirements at some slight increase in the total number of calculations, is the other alternative algorithm to be used for extremely large scale problems.

N80-27161/2 PC **A03/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Numerical Technique for Calculation of the Noise of High-Speed Propellers with Advanced Blade Geometry.
P. A. Nystrom, and F. Farassat. Jul 80, 33p NASA-TP-1662, L-13535

A numerical technique and computer program were developed for the prediction of the noise of propellers with advanced geometry. The blade upper and lower surfaces are described by a curvilinear coordinate system, which was also used to divide the blade surfaces into panels. Two different acoustic formulations in the time domain were used to improve the speed and efficiency of the noise calculations: an acoustic formualtion with the Doppler factor singularity for panels moving at subsonic speeds and the collapsing sphere formulation for panels moving at transonic or supersonic speeds. This second formulation involves a sphere which is centered at the observer position and whose radius decreases at the speed of sound. The acoustic equation consisted of integrals over the curve of intersection for both the sphere and the panels on the blade. Algorithms used in some parts of the computer program are discussed. Comparisons with measured acoustic data for two model high speed propellers with advanced geometry are also presented.

N80-27212/3 PC **A03**
Societe Nationale Industrielle Aerospatiale, Paris (France). Direction Centrale Industrielle.
Value Analysis for the Aircraft Airbus l'Analyse de la Valeur dans UN Programme International.
R. Tassinari. 1979, 34p SNIAS-792-501-105
Text in French. Presented at Soc. Of AM. Value Eng. Intern. Conf. On Save Proc., Vol. 19, 1979.

The implementation of an agreement among Germany, England, France, Netherlands, and more recently, Spain, to develop a transport aircraft is discussed with emphasis on the economic and technical aspects involved. The method in which the various tasks were assigned and performed is described. Project and value engineering considerations are reviewed as well as the factors determining the choice of materials and the methods for optimizing the system. The management of modification procedures is described and some value analysis examples are included.

PAT-APPL-6-144 462 PC **A02/MF A01**
Department of the Navy Washington DC
A Method and Apparatus for Boresighting an Aircraft.
Patent Application,
Jack Bates, Gary L. Petersen, and Steven E. Ayler. Filed 28 Apr 80, 15p AD-D007 316/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus and method for boresighting an aircraft while it is on board an aircraft carrier is disclosed. Strapdown gyro triads are attached to preselected points on the aircraft and the item to be boresighted, and an electronics package containing a digital computer transforms the resulting cosine matrices. The operator reads a display and makes the necessary manual adjustments. (Author)

PAT-APPL-6-160 259 PC **A02/MF A01**
Department of the Air Force Washington DC
Aerial Refueling Boom Control Apparatus.
Patent Application,
Leonard G. Bekemeyer. Filed 17 Jun 80, 10p AD-D007 361/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses an aerial refueling boom control apparatus utilizing a plurality of strain gage bridges which are positioned in the vertical and horizontal planes of a load carrying structure, to measure the loading forces occurring therein. (Author)

PATENT-4 187 760 Not available NTIS
Department of the Navy Washington DC
Inflight, Stores, Forces and Moments Measuring Device.
Patent,
Lloyd J. Holt. Filed 19 Sep 78, patented 12 Feb 80, 5p AD-D007 335/3, PAT-APPL-943 885
Supersedes PAT-APPL-943 885-78, AD-D005 436.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A measuring device for measuring the inflight forces and moments on a store carried by an aircraft, is disclosed wherein a dynamic pressure sensing device is incorporated in a stores suspension member so that a true constant indication of plus or minus forces and moments on the store can be inputted to an on-board aircraft computer for use in controlling the force required to eject the store from the aircraft. (Author)

PATENT-4 204 154 Not available NTIS
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
Portable Device for Use in Starting Air-Start-Units for Aircraft and Having Cable Lead Testing Capability.
Patent,
W. R. Rosier, and G. G. Volk. Filed 9 Mar 78, patented 20 May 80, 7p N80-26599/4, PAT-APPL-885 066
Supersedes PAT-APPL-885 066-78, N78-19166 (16 - 10, p 1263). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A portable device for starting aircraft engines and the like is disclosed. The device includes a lead testing and motor starting circuit characterized by: (1) a direct current voltage source, (2) a pair of ter-

minal plugs connected with the circuit (each being characterized by a first, second, and third terminal) (3) a pair of manually operable switches for connecting the first terminal of each plug of the pair to the positive side of the voltage source, (4) a circuit lead connecting to the second terminal of each plug the negative side of said source, (5) a pair of electrical cables adapted to connect said first and second terminals of each plug to an air-start unit, and means for connecting each cable of the pair of cables between the first terminal of one plug and the third terminal of the other plug of the pair, and (6) a second pair of manually operable switches for selectivity connecting the third terminal of each plug of the pair to the negative side of the voltage source.

1D. Aircraft Flight Control and Instrumentation

AD-A085 847/2 PC **A06**/MF **A01**
AiResearch Mfg Co of California Torrance
Electromechanical Actuation Development.
Final rept. 20 Sep 78-15 Dec 79,
Robert A. Lewis, John Gray, and Neal E. Wood.
Feb 80, 119p 80-16763, AFWAL-TR-80-3024
Contract F33615-76-C-3043

Electromechanical actuation of primary flight control surfaces has been demonstrated by the development of an integrated rotary hinge-line dual-redundant actuation unit. The controller power level of 30 amp at 270 vdc was demonstrated. Thermal characteristics of the motor and actuator were evaluated at ambient temperatures ranging from -65 F to 250 F. (Author)

N80-26264/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Low-Speed Airspeed Calibration Data for a Single-Engine Research-Support Aircraft.
B. J. Holmes. Jun 80, 22p NASA-TM-81832

A standard service airspeed system on a single engine research support airplane was calibrated by the trailing anenometer method. The effects of flaps, power, sideslip, and lag were evaluated. The factory supplied airspeed calibrations were not sufficiently accurate for high accuracy flight research applications. The trailing anemometer airspeed calibration was conducted to provide the capability to use the research support airplane to perform pace aircraft airspeed calibrations.

N80-26296/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Head-Up Display in the Non-Precision Approach.
J. M. Naish. May 80, 20p NASA-TM-81167, A-8061

The problem of head-up guidance for an aircraft making an instrument approach without glide slope information is discussed. Requirements for path control are considered for each section of the approach profile and a head-up display is developed to meet these needs. The display is an unreferenced flight director which is modified by adding a ground referenced symbol as an alternative guidance component. The director is used for holding altitude in the first segment and for descent at a controlled rate in the second segment. It is used in the third segment to maintain the minimum decision altitude while assessing the approach situation. This is done by means of occasional brief changes to the referenced symbol. In the final segment a visual approach is made with the referenced symbol used continuously for path control. The display is investigated experimentally in simulated approaches made by three pilots. The results show a fair agreement between objective and subjective estimates of the quality of landing decisions.

N80-26328/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
Development and Flight Test Results of an Autothrottle Control System at Mach 3 Cruise.
G. B. Gilyard, and J. J. Burken. Jul 80, 40p NASA-TP-1621, H-1090

Flight test results obtained with the original Mach hold autopilot designed the YF-12C airplane which uses elevator control and a newly developed Mach hold system having an autothrottle integrated with an altitude hold autopilot system are presented. The autothrottle tests demonstrate good speed control at high Mach numbers and high altitudes while simultaneously maintaining control over altitude and good ride qualities. The autothrottle system was designed to control either Mach number or knots equivalent airspeed (KEAS). Excellent control of Mach number or KEAS was obtained with the autothrottle system when combined with altitude hold. Ride qualities were significantly better than with the conventional Mach hold system.

PB80-809064 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Head Up Displays. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 133p
Sponsored in part by National Technical Information Service, Springfield, VA.

Head up displays (HUDs) are the subject of this retrospective survey of much of the world aerospace literature. Design, fabrication and use, and applications to specific aircraft, such as the F-4E, Jaguar, Tornado, F-18, Viggin, A-10, AV-8B, Sea Harrier, Space Shuttle, helicopters, KC-135S, and in commercial aircraft, are discussed. A look at the future in this field is also presented. (Contains 116 citations)

PB80-809072 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Head Up Displays. 1976-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Apr 80,
Robert Hippler. May 80, 80p
Sponsored in part by National Technical Information Service, Springfield, VA.

Head up displays (HUDs) are the subject of this retrospective survey of much of the world aerospace literature. Design, fabrication and use, and applications to specific aircraft, such as the F-4E, Jaguar, Tornado, F-18, Viggin, A-10, AV-8B, Sea Harrier, Space Shuttle, helicopters, KC-135S, and in commercial aircraft, are discussed. A look at the future in this field is also presented. (Contains 70 citations)

1E. Air Facilities

PB80-199995 PC **A08**/MF **A01**
Massachusetts Aeronautics Commission, Boston.
An Action Program for Airport Related Noise Abatement.
Nov 76, 169p

The report presents a general discussion of the factors influencing noise exposure at the study airports as they are expected to change between now and 1985, the various abatement options that are possible when dealing with aircraft noise exposure, and finally, specific abatement considerations for each of the eight key airports in the study, as required to reduce exposure levels to the restrictive limits.

2. AGRICULTURE

2A. Agricultural Chemistry

UCID-18621 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Changing Patterns in World Nitrogen Fertilizer Production and Trade.
C. K. Briggs, and I. Y. Borg. 2 May 80, 13p
Contract W-7405-ENG-48

Nitrogen fertilizer production and exports are shifting from the United States, Western Europe, and Japan to countries that have the largest and cheapest reserves of natural gas, the most widely used feedstock for ammonia production. This report documents this shift using 10-year historical plots of production and consumption of nitrogenous fertilizers in developed, Communist, and less-developed countries (which include OPEC). While world production and consumption has been increasing at a rate of 6.5%/year over the past decade, the contribution of developed countries to production as a percent of the total has been steadily declining. At the same time the Communist and LCD's contribution as a percent of the total has increased. As a consequence the US has become a net importer of nitrogenous fertilizer. Exports from USSR and some Comecon countries along with OPEC have increased. Projected expansion of ammonia capacity (hence of fertilizer production) in these same countries suggest that these trends will continue. The reason for these changes lies in the changing availability and pricing of natural gas in the US and other developed countries. 8 references, 5 figures, 1 table. (ERA citation 05:024209)

2B. Agricultural Economics

PB80-197866 PC **A08**/MF **A01**
Indian Agricultrual Research Inst., New Delhi.
Contributions to a Changing Agriculture (IARI Annual Report, 1977).
1979, 166p

Indian agriculture continues to be in early stages of its transformation from subsistence to modern with emphasis on high levels of yield. Already some progress has been made in increasing food production, but much remains to be done to accelerate the change. A key role in this process of transformation is being played by new crop varieties and their associated production technology. This report describes studies undertaken at the Institute that are helping to generate new production technologies. Topics include production technologies for wheat, barley, maize, sorghum, pearl millet, rice, pulses, oilseeds, and cotton; multiple and intercropping systems; dryland cropping; various mission-oriented research projects; evolving new techniques.

PB80-197932 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. International Economics Div.
Indices of Agricultural and Food Production for Europe and the U.S.S.R.: Average 1961-65 and Annual 1970 through 1979.
Boyd Chugg. Jun 80, 48p STATISTICAL BULL-635
See also report dated Jun 79, PB-297 431.

Indices of total and per capita agricultural and food production for Europe and the U.S.S.R. are presented for the base period 1961-65 and annually for 1970-79. Data for population, agricultural production, and aggregates of agricultural and food production are also included. Country indices are calculated by Laspeyres' base-weighted aggregate formula.

PB80-198419 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. International Economics Div.
Indices of Agricultural Production in Africa and the Near East, 1970-79.
Jun 80, 59p STATISTICAL BULL-637

Indices of agricultural production in foreign countries are prepared as part of a continuing assessment of current agricultural situations abroad. The country indices are calculated by Laspeyres' base-weighted aggregative formula, are constructed from production series given in thousands of metric tons. Time reference is the calendar year in which the bulk of the crop is harvested, or, in some cases, notably coffee and cocoa beans, the marketing year beginning in the indicated calendar year. The base period for the indices is the average of calendar years 1961-65, weights are estimated base period average prices received by farmers expressed in U.S. dollars per metric ton. A separate schedule for price weights is used for each country.

PB80-199557 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.

Owner-Operator Costs of Hauling Fresh Fruits and Vegetables in Refrigerated Trucks,
Patrick P. Boles. Jul 80, 27p ESCS-82
See also report dated Jul 77, PB-270 625.

Cost per mile for owner-operators hauling fresh fruits and vegetables is estimated. Analysis is similar to a 1979 study of multitruck firms hauling fresh fruits and vegetables. Data from eight owner-operators were used as cost elements. Costs per mile were estimated for (1) trips of different lengths and operating conditions and (2) for the number of miles driven each year. Unit costs tended to decrease for longer trips and as annual mileage increased. Driver cost was the most expensive item, and included wages that owner-operators paid themselves, wages for a driver-helper, and trip-related costs such as per diem. Fuel was the second most expensive item, and included fuel for operating the tractor and refrigeration unit.

2C. Agricultural Engineering

N80-26877/4 PC **A02**/MF **A01**
Grammer (Willibald), Amberg (Germany, F.R.). Abteilung Solar-Klima-Technik.
Solar Collector System Using Air Collectors for a Pre-Drying Facility in a Grass Drying Plant.
Final Report.
H. Barthel. Sep 79, 19p SKT-TEIL-1, BMFT-FB-T-79-30
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The design, construction, and installation of a solar collector system for the drying of grass with hot air is described. The collector surface measures 1456 square meters. Measurements were taken during field tests and their results are reported. Water removal is about 18%

PATENT-4 208 861 Not available NTIS
Department of Agriculture, Washington, DC.
Mechanical Shaker Assembly for Continuous Harvesting of Fruit.
Patent,
Bernard R. Tennes, and Galen K. Brown. Filed 26 Sep 78, patented 24 Jun 80, 7p PB80-204845, PAT-APPL-945 954
Supersedes PB-288 607.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a mechanical shaker assembly adapted for use with an over-the-row power frame for the continuous harvesting of horticultural crops uniquely combines oscillating sway bars for dislodging the crops with a pendulum system for absorbing vibrations otherwise transmitted to the power frame by the sway bars.

PB80-196173 PC **A16**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
Selected Irrigation Return Flow Quality Abstracts, 1978. Eight Annual Issue.
Final rept.,
Gaylord V. Skogerboe, Wynn R. Walker, Satyansu S. Kundu, and Mary Lindburg. Apr 80, 360p EPA-600/2-80-073
Grant EPA-R-800426
See also report dated Jan 79, PB-292 359.

Research related to the quality of irrigation return flow is being conducted at numerous institutions throughout the western United States. Related work is also underway at other institutions in the United States as well as other portions of the world. Approximately 100 sources of material have been searched for articles pertinent to the Irrigated Crop Production research and development program. These articles describe water quality problems resulting from irrigated agriculture, potential technological solutions for controlling return flows, recent research pertinent to return flow investigations, and literature associated with institutional constraints in irrigation return flow quality control.

PB80-196181 PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK. Land Treatment Task Force.
Wastewater Irrigation of Rice.
Technical rept.,
Jack L. Witherow. May 80, 27p EPA-430/9-80-0005

This bulletin was prepared as one of a series of reports to furnish information on studies and current practices on use of municipal effluents for crop production. The overall series provides in-depth presentations of available information on topics of major interest and concern related to municipal wastewater treatment and sludge management. It is a continuing effort to provide current state-of-the-art information concering sewage and sludge processing and disposal/utilization alternatives, costs, transport, environmental influences, and health factors.

2D. Agronomy and Horticulture

PB80-196769 PC **A04**/MF **A01**
Henry Krumb School of Mines, New York. Aldridge Lab. of Applied Geophysics.
Biogeochemical Laboratory Studies to Establish the Spectral Properties of Mineral-Induced Stress in Plants.
Rept. no. 1,
William Collins, Sheng-Huei Chang, John T. Kuo, and Alberto Mancinelli. 1980, 74p NSF/RA-800038
Grant NSF-DAR78-16320

Controlled laboratory experiments have successfully duplicated and verified subtle spectral properties observed over natural mineral deposits. This investigation stems from studies of natural geochemical anomalies observed in airborne spectral surveys of fresh covered mineral deposits. The airborne data contain considerable noise interference introduced by natural forest canopy variations, topography, atmospheric bands, etc. Field data are further complicated by uncertain ground control over both the geology and other canopy effects such as species. Near infrared absorption edge shifts related to metal stress are reproduced. The absorption edge becomes progressively steeper under metal-induced stress.

PB80-196793 PC **A04**/MF **A01**
Northern States Power Co., Minneapolis, MN.
A Demonstration of Beneficial Uses of Warm Water from Condensers of Electric Generating Plants.
Final rept. May 75-Apr 80,
L. L. Boyd, G. C. Ashley, J. S. Hietala, R. V. Stansfield, and T. R. C. Tonkinson. May 80, 75p EPA-600/7-80-099
Grant EPA-S-803770
Prepared in cooperation with Minnesota Univ., Minneapolis.

The report gives results of a project to demonstrate that warmed cooling water from condensers of electric generating plants can effectively and economically heat greenhouses. The 0.2-hectare demonstration greenhouse, at Northern States Power Co.'s Sherburne County (Sherco) Generating Plant, used 29.4 C water to heat both air and soil: finned-tube commercial heat exchangers were used to heat the air; and buried plastic pipes, the soil. Warm water from the Sherco 1 cooling tower was piped over 0.8 km to the greenhouse where it was cooled from 2.7 to 5.6 C before returning to the cooling tower basin. Roses and tomatoes were the principal crops in the 3-year test, although other flowers and vegetables, and conifer seedlings were also grown. The warm water heating system supplied all the greenhouse heating requirements, even at ambient temperatures as low as -40 C. Roses, snapdragons, geraniums, tomatoes, lettuce, and evergreen seedlings were grown successfully.

PB80-198286 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Soil Taxonomy as a Guide to Economic Feasibility of Soil Tillage Systems in Reducing Nonpoint Pollution.
Staff rept.,
Harold R. Cosper. Mar 79, 42p

Soil taxonomy provides the method and precision to group soils according to the likely effects on crop yields of reduced tillage and no tillage practices. The use of taxonomy for this purpose is discussed and illustrated, including its advantages over the Capability Classification System.

2F. Forestry

PB80-197742 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Summer Moisture Contents of Understory Vegetation in Northeastern Minnesota.
Forest Service research paper (Final),
Robert M. Loomis, Peter J. Roussopoulos, and Richard W. Blank. Feb 80, 10p FSRP-NC-179

Summer moisture contents and factors for converting fresh plant weights to ovendry biomass estimates are presented for some herbs, mosses, and small shrubs found in the upland forest stands of northeastern Minnesota.

PB80-198047 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Twenty-year Results of the Lake States Jack Pine Seed Source Study.
Forest Service research paper (Final),
Richard M. Jeffers, and Raymond A. Jensen. Apr 80, 25p FSRP-NC-181

Variation among Lake States jack pine seed sources in survival, total height, diameter, volume per tree, and volume per acre grown for 20 years at 14 locations in the Lake States are presented and discussed. Seed collection and seed production area recommendations are included.

PB80-198336 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Macronutrient Deficiency Symptoms in Seedlings of Four Northern Hardwoods.
Forest Service general technical rept. (Final),
Gayne G. Erdmann, Frederick T. Metzger, and Robert R. Oberg. Jun 80, 40p FSGTR-NC-53
Color illustrations reproduced in black and white.

The report presents illustrations in color and describes the visual deficiency symptoms for N, P, K, Ca, Mg, and S in sugar maple, red maple, white ash, and paper birch seedlings. Effects of these deficiencies on the development and nutrient composition of seedlings are also examined.

PB80-198963 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Regeneration and Productivity of Aspen Grown on Repeated Short Rotations.
Forest Service research paper (Final),
Donald A. Perala. Feb 80, 11p FSRP-NC-176

Regeneration and productivity of aspen cannot be sustained on rotations shorter than about 8 years. Productivity losses on short rotations are physiological and morphological rather than nutritional in nature. Stump and root collar sprouts, which are rare in mature stands, were more numerous than root suckers.

PB80-198971 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
A Provisional Assessment of Triclopyr Herbicide for Use in Lake States' Forestry.
Forest Service research paper (Final),
Donald A. Perala. Apr 80, 11p FSRP-NC-180

The report compares rate-response curves of some typical Lake States hardwoods to triclopyr. Also it estimates the persistance and mobility of triclopyr in forest soil. The study evaluates the safety of triclopyr to white spruce.

PB80-199425 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
The Market for Forest and Associated Land in Southern Illinois: Implications for Land Management.
Forest Service research paper (Final),
John F. Dwyer, and David C. Baumgartner. Jan 80, 12p FSRP-NC-175

The report examines the market for forest and associated land in two southern Illinois counties and describes the attendant implications for land management.

PB80-199458 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
The Cost of Debarked Whole-Tree Chips: Stump to Digestor.
Forest Service research paper (Final),
Frank E. Biltonen, James A. Mattson, and Edsel D. Matson. Jan 80, 13p FSRP-NC-174

A cost analysis of a 60 green ton per hour chip debarking plant predicts a processing cost of $7.58 per dry output ton, exclusive of raw materials costs.

PB80-203854 PC **A19**/MF **A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Proceedings of the National Urban Forestry Conference Held at Washington, DC. on November 13-16, 1978. Volume I, Session I.
Final rept.,
H. Ken Cordell, Henry Gerhold, Larry Wood, and George Hopkins. 1980, 448p ESF-PUB-80-003-VOL-1, NEFES-80-83
See also Volume 2, PB80-203862.

Partial contents:
- The challenge of achieving a greener urban America;
- Assessing the benefits of urban public open space;
- Planning and management of the urban biophysical environment;
- Urban gardens;
- Public involvement in urban wildlife planning and action programs;
- Social benefits of urban forests and related green spaces in cities;
- People, homes, and wildfires;
- Turning liabilities into assets: organic mulching;
- Urban streets and parking spaces: blight or benefit;
- Jobs in urban forestry;
- Urban vegetation and microclimate;
- Urban vegetation and air quality;
- Water resources in the urban forest environment;
- Culture and protection activities of urban forests;
- Planning and managing the urban forests.

PB80-203862 PC **A19**/MF **A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Proceedings of the National Urban Forestry Conference Held at Washington, DC. on November 13-16, 1978. Volume II, Session II and III.
Final rept.,
H. Ken Cordell, Henry Gerhold, Larry Wood, and George Hopkins. 1980, 432p ESF-PUB-80-003-VOL-2, NEFES-80-84
See also Volume 1, PB80-203854.

Tree care activities -- their scope, organizations that provide services and techniques that are used -- were discussed in Session II of the National Urban Forestry Conference.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N80-27254/5 PC **A02**/MF **A01**
Royal Observatory, Edinburgh (Scotland).
The UK 1.2M Schmidt Telescope and the Southern Sky Survey. Part 3: Plate Copying.
P. R. Standen, and K. P. Tritton. 1979, 12p ROE-OR-5, ISSN-0309-099X

The plate copying procedures used to make the atlas film copies of the blue (3aJ) half of a southern sky survey are described. The accepted original negatives for the survey are on 356 x 356 mm glass plates, 1 mm thick. The copying process has been optimized for the faintest objects. Intermediate positives are made using Kodak Process emulsion on 356 mm x 356 mm glass plates 3 mm thick. Copy plates are developed in Kodak D-76. Atlas film copies are produced from the positive using Kodak Aerographic 4421 emulsion on Estar Thick base. A Versamat 317 automatic processor is used for developing the films in Versamat B developer. All quality control procedures are given.

3B. Astrophysics

AD-A086 010/6 PC **A05**/MF **A01**
Rochester Univ NY Dept of Mechanical and Aerospace Sciences
Dynamical Phenomena in Sunspots.
Final rept. 1 Oct 76-30 Sep 79,
John H. Thomas, Alfred Clark, Jr., and Mark A. Scheuer. 15 Feb 80, 85p AFGL-TR-80-0064
Contract F19628-77-C-0079

The reflection of upward and downward propagating Alfven waves in sunspots is studied, in order to assess the possibility of cooling by Alfven waves. Wave reflection is studied by means of a three-layer model of the umbral atmosphere. The results show very strong downward reflection of Alfven waves in the photosphere and low temperature, but only weak upward reflection in the convection zone. Further study of more realistic magneto-atmospheric waves (including the effects of compression and buoyancy) shows strong upward reflection in the convection zone as well as strong downward reflection in the photosphere and low chromosphere. These results tend to rule out significant sunspot cooling by waves. A study of a simple thermal model of a sunspot, based on the concept of partial inhibition of convection, shows that the inhibition mechanism can yield acceptable distributions of surface temperature. The results of this model also show that: (1) the edge of the umbra is sharp, even for deep spots; (ii) deep spots produce weak bright rings, but shallow spots produce intense bright rings in conflict with observations; and (iii) only a shallow surface layer of the sunspot is cool, the rest being warmer than the surroundings. Umbral oscillations in sunspots are studied and identified a resonant response of the umbral atmosphere to forcing by oscillatory convection in the subphotosphere. The full linearized equations for magneto-atmospheric waves are solved numerically for a detailed model of the umbral atmosphere. It is suggested that the Sun's radius and surface temperature vary with the solar cycle due to the variation of total magnetic buoyancy in the convection zone over the cycle of the solar dynamo.

AD-A086 250/8 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Observatory Report: Sagamore Hill Radio Observatory,
Donald A. Guidice. 1980, 3p Rept no. AFGL-TR-80-0162
Pub. in Bulletin American Astronomical Society, v12 n1 p361-362 1980.

No abstract available.

ITA-47 PC **A03**/MF **A01**
Oslo Univ. (Norway). Inst. of Theoretical Astrophysics.
Stationary Flow in Magnetic Tubes of Force. Discussion of the Pikel'Ner Solution for Solar Prominences.
O. Engvold, and E. Jensen. 1976, 39p
U.S. Sales Only.

For one particular set of boundary conditions Pikel'ner obtained a stationary solution displaying a condensation, which he applied to quiescent prominences. Calculations in the stationary case for a range of parameters have been carried out, after some modifications of the basic equations. These modifications involved a complete non-LTE formulation of the ionization equilibrium, an improved radiative loss-function and more accurate values of the thermodynamic parameters. The calculations were carried out for a hydrogen-helium mixture with B = 10 and for a pure hydrogen gas. The solutions were terminated where the optical thickness in Ly alpha along the tube exceeded unity, corresponding to T approx.equal to 20 000K. The solutions are strongly dependent upon the geometry of the tube of force. Condensations may be made to appear on the ascending as well as on the descending branch of the magnetic arch by varying the parameters. Solutions also depend strongly upon the energy input into the tube at the footpoint, mainly determined by the injection velocity and the starting value of the temperature gradient. The radiative loss is of less importance for the values of the gas pressure close to the Pikel'ner case. Recent observational data indicate gas pressure in the chromosphere-corona transition region as much as 4 times the boundary pressure assumed by Pikel'ner. Such a high initial pressure, however, produce no condensation. In the temperature range 1.2x10 exp 5 K > T > 5x10 exp 4 K the temperature gradients in the condensations are in fair agreement with observations of the CIII lines in the EUV-region. For higher temperatures 5x10 exp 5 K > T > 2x10 exp 5 K our temperature gradients are much smaller than those indicated by observations. (Atomindex citation 11:501150)

N80-26581/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Radio Emission Evolution of Nonstationary Sources in the Hedgehog Model.
Y. A. Kovalev, and V. P. Mikhaylutsa. Jun 80, 24p NASA-TM-75210, PR-324
Contract NASW-3198
Transl. Into English of 'Evolyutsiya Radioizluchen-iya Nestatsionarnykh Istochnikov V Modeli Yezhik'', Fiept. Pr-324, Moscow, 1977 p 1-26. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Academy of Sciences (Ussr).

Correlations are obtained for numerical calculation of flux F sub v and polarized radiation intensity of a cloud of arbitrary geometry, consisting of ultrarelativistic electrons that dissipate in a radial magnetic field of the nucleus at a random angle to the observer. It is possible that some of the variable extragalactic objects that were previously described by the Shklovskiy model are young formations in the examined model. Radio astronomical observations would permit a determination of their distance, age, and lifetime.

N80-27240/4 PC **A12**/MF **A01**
Astronomische Gesellschaft, Hamburg (Germany, F. R.).
Review Articles of the Astronomische Gesellschaft, No. 47.
1980, 272p ISSN-0374-1958
Text in German and English.

No abstract available.

N80-27251/1 PC **A03**/MF **A01**
Smithsonian Astrophysical Observatory, Cambridge, Mass.
Data Reduction and Analysis of SAS-1 Data.
Final Report.
R. Giacconi. Feb 79, 30p NASA-CR-159990
Contract NAS5-20048

An abstracted bibliography of 59 articles addressing the analysis of X-ray observations from the UHURU X-Ray Observatory (SAS-1) is presented. Investigations of galactic and extragalactic X-ray sources, X-ray binaries, and transient and burst phenomena are highlighted.

N80-27252/9 PC **A03**/MF **A01**
South African Astronomical Observatory, Sutherland.
South African Astronomical Observatory, 1978.
Technical Report, period ending 1 Jan. 1979.
8 Feb 79, 32p

Summaries of the research conducted during 1978 are presented. The research was in the area of globular clusters, variable stars, galactic structure, Magellanic clouds, X-ray sources, and Earth satellites. Publications during this period are listed, and the equipment, and facilities are described.

N80-27255/2 PC **A04**/MF **A01**
Biospherics, Inc., Rockville, MD.
Development of Biological and Nonbiological Explanations for the Viking Label Release Data.
Final Report, 15 Feb. 1979 - Feb. 1980.

1 Jul 80, 74p NASA-CR-163291
Contract NASW-3249

The plausibility that hydrogen peroxide, widely distributed within the Mars surface material, was responsible for the evocative response obtained by the Viking Labeled Release (LR) experiment on Mars was investigated. Although a mixture of gamma Fe2O3 and silica sand stimulated the LR nutrient reaction with hydrogen peroxide and reduced the rate of hydrogen decomposition under various storage conditions, the Mars analog soil prepared by the Viking Inorganic Analysis Team to match the Mars analytical data does not cause such effects. Nor is adequate resistance to UV irradiation shown. On the basis of the results and consideration presented while the hydrogen peroxide theory remains the most, if not only, attractive chemical explanation of the LR data, it remains unconvincing on critical points. Until problems concerning the formation and stabilization of hydrogen peroxide on the surface of Mars can be overcome, adhere to the scientific evidence requires serious consideration of the biological theory.

N80-27256/0 PC **A07**/MF **A01**
Martin Marietta Corp., Denver, Colo.
Study of Sample Drilling Techniques for Mars Sample Return Missions.
Final Report.
D. C. Mitchell, and P. T. Harris. Apr 80, 140p
NASA-CR-160723, MCR-79-615-ISSUE-3
Contract NAS9-15907

To demonstrate the feasibility of acquiring various surface samples for a Mars sample return mission the following tasks were performed: (1) design of a Mars rover-mounted drill system capable of acquiring crystalline rock cores; prediction of performance, mass, and power requirements for various size systems, and the generation of engineering drawings; (2) performance of simulated permafrost coring tests using a residual Apollo lunar surface drill, (3) design of a rock breaker system which can be used to produce small samples of rock chips from rocks which are too large to return to Earth, but too small to be cored with the Rover-mounted drill; (4)design of sample containers for the selected regolith cores, rock cores, and small particulate or rock samples; and (5) design of sample handling and transfer techniques which will be required through all phase of sample acquisition, processing, and stowage on-board the Earth return vehicle. A preliminary design of a light-weight Rover-mounted sampling scoop was also developed.

N80-27257/8 PC **A03**/MF **A01**
Santa Clara Univ., CA. Dept. of Physics.
Wind Tunnel Simulation of Martian Sand Storms.
R. Greeley. 8 Jul 80, 31p NASA-CR-163262
Grant NSG-2286

The physics and geological relationships of particles driven by the wind under near Martian conditions were examined in the Martian Surface Wind Tunnel. Emphasis was placed on aeolian activity as a planetary process. Threshold speeds, rates of erosion, trajectories of windblown particles, and flow fields over various landforms were among the factors considered. Results of experiments on particles thresholds, rates of erosion, and the effects of electrostatics on particles in the aeolian environment are presented.

N80-27258/6 PC **A02**/MF **A01**
Arizona State Univ., Tempe.
Research on Lunar Mare Emplacement and Impact Cratering Experiments.
R. Greeley, P. H. Schultz, and D. E. Gault. 10 Jul 80, 4p NASA-CR-163264
Grant NSG-7429

A model was derived enabling the interpretation of lunar styles of volcanism through the analysis of various surface features. The model was applied to several areas on the Moon, including the Orientale Basin, the Smythii Basin, the Herigonious region, and several highland areas. Concurrent with the application of the model, several topical studies of various aspects of lunar volcanism were completed. A series of impact crater experiments was conducted at NASA Ames in order to determine the effect that viscous targets would have on cratering mechanics and morphology for application in studies of Martian ejecta flow craters. The results of the experiments led to a model that can account for the formation of multiple flow lobes and the general morphology of some aspects of Martian craters.

N80-27259/4 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN.
On the Chemical Composition of L-Chondrites.
C. W. Neal, R. T. Dodd, E. Jarosewich, and M. E. Lipschutz. Jul 80, 36p NASA-CR-163260
Contract NGL-15-005-140
Submitted for Publication.

Radiochemical neutron activation analysis of Ag, As, Au, Bi, Co, Cs, Ga, In, Rb, Sb, Te, Tl, and Zn and major element data in 14 L4-6 and 3 LL5 chondrites indicates that the L group is unusually variable and may represent at least 2 subgroups differing in formation history. Chemical trends in the S/Fe rich subgroup support textural evidence indicating late loss of a shock formed Fe-Ni-S melt; the S/Fe poor subgroup seemingly reflects nebular fractionation only. Highly mobile In and Zn apparently reflect shock induced loss from L chondrites. However, contrasting chemical trends in several L chondrite sample sets indicate that these meteorites constitute a more irregular sampling of, or more heterogeneous parent material than do carbonaceous or enstatite chondrites. Data for 15 chondrites suggest higher formation temperatures and/or degrees of shock than for LL5 chondrites.

N80-27261/0 PC **A05**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Magnetic Pumping of Particles in the Outer Jovian Magnetosphere.
J. E. Borovsky. Mar 80, 81p NASA-CR-163022, REPT-80-5
Grant NSG-7632, Contract NGL-16-001-002
Sponsored in Part by NSF.

The mechanism of magnetic pumping consists of two processes, the adiabatic motion of charged particles in a time varying magnetic field and their pitch-angle diffusion. The result is a systematic increase in the energy of charged particles trapped in mirror (and particularly, magnetospheric) magnetic fields. A numerical model of the mechanism is constructed, compared with analytic theory where possible, and, through elementary exercises, is used to predict the consequences of the process for cases that are not tractable by analytical means. For energy dependent pitch angle diffusion rates, characteristic 'two temperature' distributions are produced. Application of the model to the outer Jovian magnetosphere shows that beyond 20 Jupiter radii in the outer magnetosphere, particles may be magnetically pumped to energies of the order of 1 - 2 MeV. Two temperature distribution functions with 'break points' at 1 - 4 KeV for electrons and 8 - 35 KeV for ions are predicted

N80-27263/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Hourly Average Values of Solar Wing Parameters (Flow Rate and Ion Temperatures) According to Data of Measurements of the Venera-9 and Venera-10 Automatic Interplanetary Stations on an Earth-Venus During the Period June 1975 - April 1976.
O. L. Vaysberg, A. V. Dyachkov, V. N. Smirnov, K. B. Tsyrkin, and R. A. Isaeva. Jun 80, 26p
NASA-TM-76213, PR-494
Contract NASW-3199
Transl. Into English of Russian Report PR-494, Moscow, 1979 p 1-50. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by Academy of Sciences (USSR), Moscow.

Four electrostatic analyzers with channel electron multipliers as detectors were used to measure solar wind ionic flow. The axes of the fields of vision of two of these analyzers were directed along the axis of the automatic interplanetary station, oriented towards the Sun, while the other two were turned in one plane at angles of +15 deg and -15 deg. The full hemisphere of the angular diagram of each analyzer was approximately 5 deg. The energetic resolution was approximately 6%, and the geometric energy was 0.002 sq cm ave. keV. Each analyzer covered an energetic range of approximately 10 in eight energetic intervals. Spectral distributions were processed in order to obtain the velocity and temperature of the protons. Tabular data show the hour interval (universal time) and the average solar wind velocity in kilometers per second.

N80-27266/9 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Particle Energization in the Inner, Nonazimuthally Symmetric Magnetospheres of Neutron Stars.
J. E. Borovsky, C. K. Goertz, and G. Joyce. Mar 80, 32p NASA-CR-163021, REPT-80-6
Grant NSG-7632, Contract NGL-16-001-002
Sponsored in Part by NSF.

The energization process of magnetic pumping, a combination of time dependent magnetic mirror fields with pitch-angle scattering, is applied to trapped charged particles drifting in corotating, azimuthally nonsymmetric neutron star magnetospheres. When particle energization is balanced by synchrotron radiation loss, it is found that protons, rather than electrons, reach considerable kinetic energies and radiate, in the X-ray regime, at rates up to the 10 to the 6th power MeV/proton/sec.

N80-27267/7 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Contribution to the Extragalactic X-Ray Background from Clusters of Galaxies.
M. C. S. Zolcinski, and A. B. C. Walker, Jr.. May 80, 22p SUIPR-811, NASA-CR-163020
NASA-CR-16020, Contract SUIPR-811

The contribution to the extragalactic background from clusters of galaxies in the 2-6 keV band was computed. Two different cluster luminosity functions and two different models for cluster evolution were considered and a cluster X-ray luminosity-temperature relationship of the type L alpha T sup alpha +1/2 was assumed. It is found that the overall contribution of clusters to the background is approximately 10% of the total observed X-ray extragalactic approximately 150 eV is superimposed on the observed background. This result is quite insensitive to the different set of assumptions made in the calculation.

N80-27268/5 PC **A14**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Advances in Planetary Geology.
A. Woronow. Jun 80, 309p NASA-TM-81979

No abstract available.

PB80-195852 Not available NTIS
National Bureau of Standards, Washington, DC.
Energy Loss by Resonance Line Photons in an Absorbing Medium.
Final rept.,
D. G. Hummer, and P. B. Kunasz. 1 Mar 80, 10p
Contract NAS5-22833
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Astrophysical Jnl. 236, n2 p609-618, 1 Mar 80.

The mean path length of photons undergoing repeated scatterings in media of large optical thickness is calculated from accurate numerical solutions of the transfer equation including the effect of frequency redistribution characteristic of combined Doppler and natural broadening. Energy loss by continuous absorption process, such as ionization or dust absorption, is discussed, and asymptotic scaling laws for the energy loss, the mean path length, and the mean number of scatterings are inferred from the numerical data.

PB80-195860 Not available NTIS
National Bureau of Standards, Washington, DC.
Outer Atmospheres of Cool Stars. III. IUE Spectra and Transition Region Models for Alpha Centauri A and B.
Final rept.,
T. R. Ayres, and J. L. Linsky. 1 Jan 80, 9p
Contracts NAS5-23274, NGL-06-003-057
Pub. in Astrophysical Jnl. 235, n1 p76-84, 1 Jan 80.

The authors describe IUE ultraviolet spectra of two nearby dwarf stars, alpha Centauri A (G2 V) and B

(K1 V). These data include high-resolution profiles of the Mg II h and k features and lower-resolution integrated fluxes of lines from the following species: H I, C I-IV, N v, O I, Al II, Si II-IV, and Fe II. It was found that surface fluxes in chromospheric and transition-region lines of alpha Cen A and B are nearly identical to those of the quiet Sun.

WIS-Ph-79/35 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
General Relativistic Effects and the Radius and Mass of X-Ray Bursters.
I. Goldman. 1979, 8p
U.S. Sales Only.

It is shown that general relativity is important both qualitatively and quantitatively for interpreting the observed parameters of X-ray bursters. Stringent upper limits for the radius and mass of a neutron star are obtained. These follow from combining the value of the average observed peak temperature in the burst (blackbody spectrum assumed) together with the requirement that the luminosity does not exceed the local critical luminosity. The limits contradict the values obtained from calculations of neutron star models, which are larger by a factor of (>=)3.5. The low values of mass and radius arise solely from general relativistic effects. The contradiction can be removed if the burst luminosity is highly non-isotropic or if static equilibrium in the surface layers (which is assumed in He flash models) is rejected. (Atomindex citation 11:501159)

WIS-Ph-79/40 MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Discussion of the Eccentric Binary Hypothesis for Transient X-Ray Sources. Gradual Acceleration Stellar Wind Model.
Y. Avni, and I. Goldman. 1979, 20p
U.S. Sales Only. Microfiche copies only.

The eccentric binary hypothesis for transient x-ray sources in the framework of the gradual acceleration stellar wind model proposed by Barlow and Cohen is examined. It is found that a consideration of the ratio of maximum to minimum luminosities and of the ratio of the durations of the high and low states, for a typical transient x-ray source, yields a rather high eccentricity, despite the gradual acceleration of the wind. When typical physical parameters for the binary members are taken into account, we find that a consistent description is possible only for very eccentric orbits (e>=0.9); thus, the model is inadequate as a general explanation of the x-ray transient phenomenon. The recurrent transient x-ray source 4U 1630-47, which was considered in the past to be a realization of the eccentric binary model, is studied, and it is demonstrated that it cannot be described consistently within the framework of the model, unless the optical primary is very peculiar. (Atomindex citation 11:501104)

WIS-Ph-79/49 PC **A05**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Simultaneous Analysis of Several Complete Samples: The V/V/sub Max/ and V/sub E//V/sub a/ Variables, with Applications to Quasars.
Y. Avni, and J. N. Bahcall. 1979, 76p
U.S. Sales Only.

Methods for applying the V/V/sub max/ variable when several complete samples are analyzed simultaneously are derived. A new, related variable V/sub e//V/sub a/, which is superior to V/V/sub max/ when sufficient observational data are available, is introduced. It is shown that statistically independent complete samples can be generated from partially overlapping samples such that each observed object appears only once in the analysis. These methods make it possible to combine the information from different complete samples, and to make an efficient use of all available data. Illustrative examples for quasars are given. It is shown how the generalized V/V/sub max/ and V/sub e//V/sub a/ can be used to find the amount of cosmological evolution of quasars and its associated range of uncertainty. This range of uncertainty is of fundamental importance for theories of quasars and for their cosmological implications. Also given, for the first time, is the formal justification of the V/V/sub max/ (and V/sub e//V/sub a/) test, through use of a variable-sample-size formalism that allows for the total number of objects in the sample to be a random variable. (Atomindex citation 11:501105)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A085 950/4 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
A Method to Predict the Parameters of a Full Spectral Distribution from Instrumentally Truncated Data.
Environmental research papers,
Robert O. Berthel. 7 Jan 80, 48p Rept nos. AFGL-TR-80-0001, AFGL-ERP-689

This report describes a method of correcting measured hydrometeor distributions that deficient in large-size particles because of instrument truncation. The corrective technique is developed with the analysis of experimental data and the application of the exponential-distribution function. A discussion is presented on the power-function equations used to define hydrometeor environments and the application of the corrected spectra to these mathematical relationships. Equations are presented for the real-time analysis of truncated distribution to provide estimates of the non-truncated spectra. (Author)

AD-A085 951/2 PC **A05**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Models for the Aerosols of the Lower Atmosphere and the Effects of Humidity Variations on their Optical Properties.
Environmental research papers,
Eric P. Shettle, and Robert W. Fenn. 20 Sep 79, 94p Rept nos. AFGL-TR-79-0214, AFGL-ERP-676

Aerosol models have been developed for the lower atmosphere. These models are representative of conditions found in rural, urban, and maritime air masses. The changes in the aerosol properties with variations in the relative humidity are discussed. To describe the aerosol optical properties in the extreme of 100 percent relative humidity, several fog models are presented. For each model the coefficients for extinction, scattering, and absorption, the angular scattering distribution, and other optical parameters have been computed for wavelengths between 0.2 and 40 microns. These aerosol models are presented together with a review of their experimental basis. The optical properties of these models are discussed and some comparisons of the model with experimental measurements are presented. (Author)

AD-A086 221/9 PC **A05**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA
Assessment of Magnetospheric Processes of Importance in HANE.
final rept. 1 Apr 78-15 Mar 79,
J. B. Cladis, G. T. Davidson, W. E. Francis, L. L. Newkirk, and M. Walt. 15 Mar 79, 84p LMSC/D634976, DNA-4822F, AD-E300 806
Contract DNA001-78-C-0081

Conditions in the unstable field-aligned current sheet above the auroral oval have been obtained from analyses of the electron and ion measurements on the S3-3 satellite. The measurements were obtained while the satellite was in and near the nominal region of the current sheet, remaining within a few degrees in invariant latitude, over a magnetic local-time interval of about 6 hours. Potential differences along the magnetic field, above and below the satellite, were inferred from the energy and pitch-angle distributions of the electrons. These potential differences, which exceeded 10 kV at times, were generally higher during the local evening than during the local afternoon, and were quite variable along the satellite trajectory, indicating latitudinal fluctuations of the current sheet with periods of 2-7 minutes. Upward flowing H+ and O+ ions were observed whenever the potential differences exceeded about .5 kV, which corresponds to the lowest energy threshold of the detectors. However, the pitch-angle distributions of the ions imply that the ions were accelerated not only along the magnetic field by the potential difference, but also perpendicularly to the field. The transverse acceleration of the ions most probably occurred through interactions with electrostatic ion cyclotron (EIC) waves, which are an expected product of the current-driven instability, and which have been observed in the current-sheet region.

AD-A086 222/7 PC **A04**/MF **A01**
SRI International Menlo Park CA
High-Latitude Scintillation Morphology, Alaskan Sector.
Topical rept. 1 May 76-1 Apr 78,
Stephen J. Matthews, and Charles L. Rino. 1 Oct 79, 53p DNA-5131T, AD-E300 808
Contract DNA001-77-C-0220

This report describes the auroral-zone scintillation morphology as deduced from two years of observations made at Poker Flat, Alaska, using the DNA Wideband satellite. The data confirm that magnetic activity is the principal factor in determining the level of both nighttime and daytime auroral-zone scintillation. No systematic seasonal variation in activity was found, although the second year (1977-1978) showed a significant increase in overall activity when compared with the first year (1976-1977). This increase is correlated with the general increase in solar activity, with the approach of the expected solar cycle maximum around 1980. The average latitudinal distribution of the nighttime scintillation activity shows a pronounced enhancement at the point where the propagation path intercepts the local L shell. The scintillation enhancement is more prominent in the phase scintillation data; this has been attributed primarily to a geometrical effect, although there is evidence of a columnar F-region source that has contributed as well.

AD-A086 248/2 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Lidar Visibility Measurements,
Eugene Y. Moroz. 1980, 5p Rept no. AFGL-TR-80-0166
Pub. in Light Scattering by Irregulary Shaped Particles, p35-37 1980.

No abstract available.

CONF-800309-5 PC **A02**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
Aerosols and Climate.
W. W. Kellogg. 1980, 18p
Contract AC02-79EV10281
International workshop on the energy/climate interactions, Munster, F.R. Germany, 3 Mar 1980.

The atmospheric burden of particles, or aerosols, has been measurably increased by human activities, especially in industrialized regions and those where slash-burn agricultural practices are followed. Some of these aerosols are directly produced when fossil fuels or other materials are burned (soot, smoke, fly ash); others are the result of photochemical reactions involving organic molecules, oxides of nitrogen, and sunlight (smog); and a third source is the oxidation of sulfur dioxide, produced when sulfur-bearing fuel is burned, to sulfuric acid thereby forming sulfate particles of droplets. In all cases, the resulting aerosols scatter and absorb both solar and infrared radiation, and therefore they influence the atmospheric heat balance. The question is the way in which they influence it, and the geographical and extent of this influence. (ERA citation 05:024589)

COO-4965-1 PC **A03**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Meteorology.
Impact of Gaseous Sulfur and Aerosols Produced by Power Plants on the CCN Budget. Progress Report, September 1, 1978-August 31, 1979.
V. K. Saxena. Mar 80, 34p
Contract AC02-78EV04965

A field experiment was carried out over Lake Michigan with an aim to delineate cloud-aerosol interactions. The PNL DC3 aircraft was used as an observational platform and a network of ground stations collected samples of precipitation which consisted of liquid phase during the early part of November and of solid phase during the January flights. The south, south-westerly surface winds were preferred in order to investigate the modifica-

tion in the physio-chemical characteristics of the sulfate-rich aerosol during its passage over the lake and before its involvement in clouds. A cloud condensation nucleus (CCN) spectrometer was installed in the DC3 which had the capability of making simultaneous measurements of Aitken nuclei concentration, cloud droplet size distribution, LWC, and SO sub 2 concentration. Cloud water was also collected for later chemical analysis through direct cloud penetrations. The CCN spectrometer measurements revealed the CCN enrichment within the subcloud layer and suggested that the cloud formation may be as important as the microphysics in evolving the droplet size spectra of clouds that were investigated over Lake Michigan. (ERA citation 05:024590)

DOE/EV/10281-1 PC **A02/MF A01**
Aspen Inst. for Humanistic Studies, Boulder, CO.
Consequences of a Hypothetical World Climate Change Produced by Increased Atmospheric Carbon Dioxide. Progress Report, 1 September 1979-31 April 1980.
W. O. Roberts. May 80, 8p
Contract AC02-79EV10281

Progress is reported on a research program seeking to understand the effects of increased global levels of atmospheric CO sub 2 as a result of human activities. An outline of the major social, economic, geopolitical and ethical issues to be faced as a result of global warming is being attempted. Groundwork is being laid for a longer-term effort to delineate possible strategies to meet the predicted challenges. (ERA citation 05:024591)

N80-26886/5 PC **A02/MF A01**
San Jose State Univ., CA.
Stratoapheric Pollutant Transports by Planetary Waves and Tropical Circulations.
Final Report, Jul. 1979 - Mar. 1980.
C. A. Riegel, and L. Pfister. Mar 80, 3p NASA-CR-163278
Contract NCC2-17

Radiosonde and U-2 aircraft data from the Intertropical Convergence Zone experiment of July, 1977 were analyzed. The radiosonde data above 15 km was plotted in the form of time-height sections so that wave motions in the meteorological variables (temperature, zonal wind, and meridional wind) could be easily delineated. The results showed the presence of a planetary 16 day Kelvin wave. More significantly, large amplitude gravity waves with vertical wavelengths on the order of 3-6 km were found. Spectral analysis of frequencies showed peaks in meridional wind variance at 2-3 days and 5 days, with the shorter periods stronger at higher altitudes. In the time domain, two instances of organized wave groups propagating upward into the stratosphere were isolated. Associated with one of these wave groups was a region of very large vertical shear in which either turbulence or small scale (10 km wavelength or less) gravity wave activity had been found by the U-2 aircraft.

N80-26973/1 PC **A05**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de Physique Generale.
Study of Trace Constituents in the Atmosphere by Absorption Spectrometry Variations Saisonnieres et Climatiques de Constituants Stratospheriques a l'Etat de Trace.
Final Report.
A. Girard, J. Besson, R. Giraudet, and L. Gramont. 16 Nov 77, 89p ONERA-RF-2/3376-PY
Contract DGRST-76-6-1051
Partly in English and French.

Measurements by infrared absorption spectrometry using the Sun as a source at sunset or at sunrise are presented. The experiments were performed in November 1976 as part of the 'latitude survey mission' from the NASA Convair 990 between 72 deg N and 52 deg S, the flight altitude was 11 km. The instrument, which is essentially a spectrometer associated with a Sun tracker automated through a control module, is briefly described. Five spectral intervals were scanned for the purpose of measuring: NO, NO2, HCl, HNO3, O3, CH4, and H2. The results show the correlated seasonal and climactic variations of trace constituents.

N80-26980/6 PC **A03/MF A01**
Ohio State Univ. Research Foundation, Columbus. Dept. of Physics.
Investigation of Infrared Spectra of Atmospheric Gases to Support Stratospheric Spectroscopic Investigations.
Semiannual Report, 1 Nov. 1979 - 30 Apr. 1980.
J. H. Shaw. Jun 80, 30p NASA-CR-163018
Grant NSG-7479

Spectroscopic instrumentation and the absorption characteristics of atmospheric gases are discussed in relation to the requirements of spectroscopic stratospheric experiments. Improvement in the spectral resolution, accuracy of the line parameters, and the ranges of atmospheric conditions over which information is to be obtained are among the factors considered. Methods of simultaneously analyzing entire bands containing many lines were developed and applied to the analysis of bands of N20 and CO2. Progress in this analysis is reported.

N80-26984/8 PC **A03/MF A01**
Uppsala Ionospheric Observatory (Sweden).
Trigger, an Active Release Experiment That Stimulated Auroral Particle Precipitation and Wave Emissions.
G. Holmgren, R. Bostroem, M. C. Kelley, P. M. Kintner, and R. Lundin. Jul 79, 34p NASA-CR-163255, UIO-SR-79-02
Submitted for Publication Sponsored by NASA, NSF, and Swedish Board for Space Activities.

The experiment design, including a description of the diagnostic and chemical release payload, and the general results are given for an auroral process simulation experiment. A drastic increase of the field aligned charged particle flux was observed over the approximate energy range 10 eV to more than 300 keV, starting about 150 ms after the release and lasting about one second. The is evidence of a second particle burst, starting one second after the release and lasting for tens of seconds, and evidence for a periodic train of particle bursts occurring with a 7.7 second period from 40 to 130 seconds after the release. A transient electric field pulse of 200 mv/m appeared just before the particle flux increase started. Electrostatic wave emissions around 2 kHz, as well as a delayed perturbation of the E-region below the plasma cloud were also observed. Some of the particle observations are interpreted in terms of field aligned electrostatic acceleration a few hundred kilometers above the injected plasma cloud. It is suggested that the acceleration electric field was created by an instability driven by field aligned currents originating in the plasma cloud.

N80-26985/5 PC **A02/MF A01**
Oulu Univ. (Finland). Dept. of Physics
On the Discrepancy Between the Magnetic D-Component and the Overhead Horizontal Current at High Latitudes.
L. Jalonen, and T. Nygren. Oct 78, 20p REPT-66/1978, ISBN-951-42-0645-2
Sponsored in Part by Finnish Acad. Of Sci.

The discrepancy between the overhead E-region current and the magnetic D-component is studied using data obtained by the Chatanika incoherent scatter radar (L - 5.6). The F-region horizontal current is estimated to be too small to cause the observed D-deflection. Also, the assumption that the magnetic effects of the Pederson and field-aligned currents cancel each other on the ground is shown to be inadequate to solve the problem. The significance of the inclination angle in the data analysis and the importance of the field aligned current sheets are discussed.

PB80-198989 PC **A05/MF A01**
SRI International, Menlo Park, CA.
Atmospheric Measurements of Selected Toxic Organic Chemicals.
Interim rept.,
H. B. Singh, L. J. Salas, A. Smith, and H. Shigeishi. Jul 80, 77p EPA-600/3-80-072
Grant EPA-805990-01

Atmospheric concentrations of 37 selected toxic organic chemicals, including aromatic hydrocarbons, halohydrocarbons, and secondary organic pollutants were measured under varying meteorological and source-strength conditions at several urban locations - Los Angeles, California; Phoenix, Arizona; and Oakland, California. Ambient air measurements of these chemicals were conducted from a suitably equipped mobile laboratory using specifically developed analytical techniques. Preliminary results on concentrations and variability, average daily exposure dosage, diurnal behavior, and atmospheric distribution, abundance, and fate are presented.

PB80-199003 PC **A06/MF A01**
SRI International, Menlo Park, CA.
ENAMAP-1 Long-Term Air Pollution Model: Adaptation and Application to Eastern North America.
Final rept. Aug 78-Mar 80,
C. M. Bhumralkar, R. L. Mancuso, D. E. Wolf, R. A. Thuillier, and K. C. Nitz. Jul 80, 103p EPA-600/4-80-039
Contract EPA-68-02-2959

The long-term EURMAP-1 model, a trajectory-type regional air pollution model extensively evaluated and applied in Europe in conjunction with studies of interregional sulfur transport and deposition, was adapted, tested, and applied to eastern North America. The adapted version, ENAMAP-1, was used to calculate monthly, seasonal, and annual distributions of sulfur dioxide and sulfate (SO2 and SO4(-2)) concentrations and wet and dry depositions over the eastern United States, as well as over the southern portions of the Canadian provinces of Quebec and Ontario. This geographical area was partitioned into 13 different regions and interregional sulfur exchanges calculated. Model calculations were based on emission data that included both the specialized data prepared for the Sulfate Regional Experiment (SURE) and the U.S. Environmental Protection Agency's National Emissions Data System (NEDS). Model results using emissions and meteorological data for the year 1977 are presented. Results include tables showing the calculated interregional exchanges of sulfur deposition between 13 regions of eastern North America. Comparisons were made between calculated and measured SO2 and SO4(-2) concentrations. Calculated and measured values show reasonable agreement and indicate that improvements in the calculated values may be achieved by refinements in the modeling of mixing heights and stability. Results are also shown for an application of the model using projected 1985 emissions in conjunction with meteorological data for 1977.

PB80-199136 PC **A03/MF A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Terrestrial Physics Services and Publications 1980.
Apr 80, 34p NOAA-80052907
See also report dated Oct 74, N75-11884.

This brochure is concerned with the products and services in the Solar-Terrestrial Physics (STP) disciplines. The identifications of the STP data disciplines and subdisciplines and related products and services with instructions on how and where to obtain them are given. There are seven major categories of data pertinent to STP. Each contains several subdisciplines. An eighth category contains miscellaneous data which are of interest to STP scientists as well as to those working in other fields. Most of these data categories are archived at NGSDC and are the basis for many of the various NGSDC publications and services.

4B. Meteorology

AD-A085 534/6 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Sensing Ice Clouds from Satellites,
James T. Bunting. 1980, 11p Rept no. AFGL-TR-80-0143
Pub. in Light Scattering by Irregularly Shaped Particles, p25-34 1980.

No abstract available.

AD-A086 034/6 MF **A01**
Meteorology International Inc Monterey CA
The Application of Measures of Synoptic Similarity to the Evaluation and Development of Atmospheric Prediction Models: Task 2.
Final rept.,

Manfred M. Holl, Michael J. Cuming, and Barbara A. Hawkins. Apr 80, 49p Mll-M-247, NEPRF-CR-80-02
Contract N00228-79-C-PP35
Supplement to Rept. no. NEPRF CR-79-01 dated Mar 79, AD-A073 098.
Availability: Microfiche copies only.

A method is described for bit-coding meteorological analyses and forecasts in terms of specifying parameters which measure pattern characteristics. By matching the associated bit strings, an absolute measure of the similarity between forecast and analyzed synoptic fields can be obtained. Applications to numerical model verification, evaluation and development are discussed. This report is a supplement to NAVENVPREDRSCHFAC CR 79-01 dated March 1979, Task 1 of same title. (Author)

AD-A086 037/9 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
14820A LANCE, Missile Number 4556, Round Number 348 APT, 12 May 1980.
Meteorological data rept.
May 80, 23p Rept no. ERADCOM/ASL-DR-1147
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 14820A LANCE, Missile Number 4556, Round Number 348 APT, are presented in tabular form. (Author)

AD-A086 038/7 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
14821AT LANCE, Missile Number 2419, Round Number 349APT, 12 May 1980.
Meteorological data rept.
May 80, 27p Rept no. ERADCOM/ASL-DR-1148
Availability: Microfiche copies only.

Meteorological data gathered for the launching of the 14821AT LANCE, Missile Number 2419, Round Number 349APT, are presented in tabular form. (Author)

AD-A086 039/5 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
17901A HONEST JOHN, Missile Numbers 559, 855, and 634, Round Numbers 667ASL, 668ASL, and 669ASL, 29 May 1980.
Meteorological data rept.
May 80, 25p Rept no. ERADCOM/ASL-DR-1149
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 17901A HONEST JOHN, Missile Numbers 669, 855, 634, Round Numbers 667ASL, 668ASL, and 669ASL, are presented in tabular form. (Author)

AD-A086 040/3 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
14823AT LANCE, Missile Number 4570, Round Number 347-AST, 9 May 1980.
Meteorological data rept.
May 80, 31p Rept no. ERADCOM/ASL-DR-1146
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 14843AT LANCE, Missile Number 4570, Round Number 347-AST are presented in tabular form. (Author)

AD-A086 045/2 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Test and Evaluation of the Airport Surveillance Radar (ASR)-8 Wind Shear Detection System (Phase II).
Interim rept. Apr-Dec 79,
D. L. Offi, W. Lewis, T. Lee, and A. DeLaMarche. May 80, 40p FAA-NA-80-17, FAA/RD-80/21

A wind shear detection system developed by the Wave Propagation Laboratory to operate with the Federal Aviation Administration (FAA) Airport Surveillance Radar (ASR)-8 was installed and is being tested at the FAA Technical Center. Second phase tests compared radar with aircraft and tower winds, evaluated the wind shear measurement capability under various weather conditions, and investigated the effectiveness of a simple two-azimuth pointing strategy and system capabilities and limitations. Results showed the system to be compatible with and to operate satisfactorily with the ASR-8. The processing and spectral display of clear air and precipitation returns is feasible. The accuracy of agreement between radar-measured winds and components of the aircraft-measured winds in both radially oriented flights and runway offset flights, using a two-azimuth pointing technique, was examined. Radar versus tower wind agreement was also examined. Potentially dangerous wind shears associated with weather during these tests were detectable. Certain system limitations also have been defined and considered. It is recommended that tests continue to complete definition of and demonstrate capabilities in all weather situations.

AD-A086 143/5 PC **A03**/MF **A01**
Battelle Columbus Labs OH
Multiwavelength Lidar Study of Fog.
Research and development technical rept.,
B. M. Herman, and R. M. Schotland. May 80, 36p ERADCOM/ASL-CR-80-0100-1
Contract DAAG29-76-D-0100

A study has been conducted to define quantitatively the range and accuracy of multispectral lidar techniques for remotely sensing the visibility and liquid water content of various types of fogs. The results indicate that the penetration of the lidar pulse into the fog is limited to a few hundred meters due to the severe attenuation of the pulse by the fog. Methods to obtain extinction, backscatter and total liquid water content are also discussed. (Author)

AD-A086 151/8 PC **A02**/MF **A01**
Weather Wing (7th) Scott AFB IL
Forecast Worksheet - A New Approach.
Final rept.,
Thomas L. Rish, and Ronald G. Shaw. 1 May 80, 22p Rept no. 7WW/TN-80/001

Forecasters are given mixtures of centralized forecasting guidance for various models, techniques, and data bases; valid for varying times or time intervals; and presented in many different ways. But to produce an operationally sound forecast, they must logically assemble the various bits and pieces, resolve all inconsistencies, and visualize the interactive changes that will be taking place in the atmosphere. This report describes the results of a study of worksheets normally used by Air Weather Service units to prepare forecasts. It identifies weaknesses that exist in many worksheets and describes a new worksheet format which provides a more logical step-by-step process for preparing forecasts. (Author)

AD-A086 242/5 PC **A02**/MF **A01**
Society for Industrial and Applied Mathematics Philadelphia PA
Mathematical Methods in the Atmospheric Sciences and Related Computational Methods.
Final conference rept.,
I. Edward Block. Nov 79, 4p AFOSR-TR-80-0479
Grant AFOSR-79-0119

The program consisted of twelve invited lecturers, two von Karman prize recipients, and one hundred thirty-three contributed papers and poster presentations. The program was organized into three symposia: Mathematical Methods in the Atmospheric Sciences, Computational Methods in Partial Differential Equations, and Adaptive Methods for Scientific Computation. The Symposium on Mathematical Methods in the Atmospheric Sciences was held on Monday, November 12. The atmospheric and related sciences provide an abundant source of problems in applied mathematics. Often problems in these areas are characterized by their extensive use of computing resources. Those attending realized they could make substantial contributions not only to the analysis of these problems, but also to the efficient use of computing in solving them. (Author)

CONF-800474-1 PC **A03**/MF **A01**
Aspen Inst. for Humanistic Studies, Boulder, CO.
Modeling the Prospects for Climatic Change: Current State-of-the-Art and Implications.
W. M. Kellogg. 4 Apr 80, 43p
Contract AC02-79EV10281
Economic methodologies for climate change, Ft Lauderdale, FL, USA, 24 Apr 1980.

It has been increasingly suggested that the world's climate is going to change in the next several decades, primarily as a result of anthropogenic perturbations to the global carbon cycle brought about by fossil fuel burning and large-scale deforestation. In order to cope with these future climatic changes, it is necessary that tools be developed to predict how complex systems respond to a given change of conditions. This report summarizes the status of our ability to model the planetary system that determines the climate. (ERA citation 05:024663)

CONF-800475-1 MF **A01**
Aspen Inst. for Humanistic Studies, Boulder, CO.
Toward a Political Analysis of the Consequences of a World Climate Change Produced by Increasing Atmospheric Carbon Dioxide.
R. Schware. 1980, 25p
Contract AC02-79EV-10281
Southwestern Political Science Association annual meeting, Houston, TX, USA, 2 Apr 1980.
Microfiche copies only.

It was Hegel's extraordinarily deep and perceptive insight that mankind is caught up in a drama that cannot be fully understood until it has been played out. The owl of Minewa spreads its wings only with the falling of the dusk. On the more hopeful side is the fact that, although we cannot know the consequences of future interactions between climate and society, we can begin to work toward political solutions and gird ourselves for ominous trends that are now coming into view. The purpose of this paper is to identify one such trend, namely the increase of atmospheric temperatures due to increased carbon dioxide (CO sub 2) and lay some initial groundwork for political research related to climate-societal interactions. (ERA citation 05:024664)

DOE/EV/02891-2 PC **A02**/MF **A01**
South Dakota School of Mines and Technology, Rapid City. Inst. of Atmospheric Sciences.
Baseline Study of the Impact of Energy Development on Weather in the Northern Plains: Project NOSAMP.
B. L. Davis, L. R. Johnson, and P. C. Yue. 8p
Contract EY-76-C-02-2891

The coal resources of Montana, Wyoming, and North Dakota are now being developed at an increasing pace, as indicated by the present mine-mouth power plant construction, applications for land leases by utility companies, and recent increases in railroad tonnage reaching eastern and midwest utility markets. That this use of coal would continue or even accelerate was an emphatic point of the recent President's energy message. Coal development is not only necessary for the nation as a whole, but in some respects desirable for the Great Plains' economy. However, every effort should be made to minimize harmful side effects. Energy developments can adversely affect water supplies downstream and pollute the atmosphere downwind. Direct adverse effects on agriculture, animal life, and human health are now well known. The possibility that energy development by-product emissions could change downwind rainfall is not as well known but, nevertheless, real. This statement cites the evidence for such effects and describes observations now being made to determine if changes in rainfall in downwind regions (principally the Dakotas) will accompany coal developments in Montana, Wyoming, and western North Dakota. Several states in the northern Great Plains have recently conducted intentional weather modification programs designed to add as much as 1 to 2 inches of precipitation per year to existing rainfall levels. The worth of a rainfall increase of this magnitude has been estimated at more than ten million dollars per year in South Dakota alone.These numbers illustrate the tremendous economic impact of even minor changes in rainfall patterns and suggest that states downwind of the proposed coal developments should examine the possibilities of downwind weather changes very closely. (ERA citation 05:021695)

NUREG/CR-1486 PC **A05/MF A01**
National Weather Service, Silver Spring, MD. Office of Hydrology.
Seasonal Variation of 10-Square-Mile Probable Maximum Precipitation Estimates - United States East of the 105th Meridian.
Hydrometeorological rept.,
Francis P. Ho, and John T. Riedel. Jun 80, 98p
NOAA-NWS-HR-53
Contract NRC-01-77-113

Estimates of the probable maximum precipitation (i.e., the theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin at a certain time of year) are given in this study for durations from 6 to 72 hours for each month of the year for 10 sq miles areas. The results are in a generalized form, that is, on maps allowing use for planning and design of any present or proposed structure for the United States east of the 105th meridian. While smaller sized areas have greater values, especially for the warm season, they are not defined in the study. For the winter season, values for smaller areas are not appreciably different from the 10 sq miles estimates in this study. The probable maximum precipitation estimates show a smooth variation with duration, season, and location.

N80-26638/0 PC **A05/MF A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A 94/183 Ghz Aircraft Radiometer System for Project Storm Fury.
Final Technical Report, 20 Sep. 1976 - 30 Apr. 1980.
J. A. Gagliano, J. A. Stratigos, R. E. Forsythe, J. M. Schuchardt, and J. M. Welch. Apr 80, 96p
NASA-CR-160000
Contract NAS5-23710

A radiometer design suitable for use in NASA's WB-57F aircraft to collect data from severe storm regions was developed. The design recommended was a 94/183 GHz scanning radiometer with 3 IF channels on either side of the 183.3 GHz water vapor line and a single IF channel for a low loss atmospheric window channel at 94 GHz. The development and construction of the 94/183 GHz scanning radiometer known as the Advanced Microwave Moisture Sounder (AMMS) is presented. The radiometer scans the scene below the aircraft over an angle of + or - 45 degrees with the beamwidth of the scene viewed of approximately 2 degrees at 94 GHz and 1 degree at 183 GHz. The AMMS data collection system consists of a microcomputer used to store the radiometer data on the flight cartridge recorder, operate the stepper motor driven scanner, and collect housekeeping data such as thermistor temperature readings and aircraft time code.

N80-26974/9 PC **A10/MF A01**
World Meteorological Organization, Geneva (Switzerland).
The Planetary Boundary Layer.
G. A. McBean, K. Bernhardt, S. Bodin, Z. Litynska, and A. P. Vanulden. 1979, 215p TN-165, WMO-530
Original Contains Color Illustrations.

An introduction to the general properties of the planetary boundary layer is given. The status and structural aspects are reviewed with an emphasis on presenting the physical insights to problems. The Ekman layer is discussed in detail with emphasis on the semi-empirical and resistance low descriptions. The tropical boundary layer is discussed. The important differences between the tropical and higher latitude boundary layers are addressed. The modelling of the atmospheric boundary layer is studied. Both research and operational types of models are reviewed. The observational methods used in boundary-layer meteorology are presented and the major observational programs that have been conducted are described. The applications of boundary layer knowledge are discussed. Three topics, the estimation of surface fluxes, aeronautical meteorology and urban boundary layers are presented in some detail while two further topics, electromagnetic and acoustic wave propagation and problems of mountain meteorology and climatology related to the boundary layer, are briefly reviewed.

N80-26993/9 PC **A03/MF A01**
SRI International Corp., Menlo Park, CA. Atmospheric Science Center.
Application of an Automatic Cloud Tracking Technique to Meteosat Water Vapor and Infrared Observations.
Final Report, 3 May 1979 - 31 May 1980.
R. M. Endlich, and D. E. Wolf. May 80, 32p
NASA-CR-159995
Contracts NAS5-25730, SRI PROJ. 8600

The automatic cloud tracking system was applied to METEOSAT 6.7 micrometers water vapor measurements to learn whether the system can track the motions of water vapor patterns. Data for the midlatitudes, subtropics, and tropics were selected from a sequence of METEOSAT pictures for 25 April 1978. Trackable features in the water vapor patterns were identified using a clustering technique and the features were tracked by two different methods. In flat (low contrast) water vapor fields, the automatic motion computations were not reliable, but in areas where the water vapor fields contained small scale structure (such as in the vicinity of active weather phenomena) the computations were successful. Cloud motions were computed using METEOSAT infrared observations (including tropical convective systems and midlatitude jet stream cirrus).

N80-26994/7 PC **A02/MF A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Evaluation and Development of Satellite Inferences of Convective Storm Intensity Using Combined Case Study Analysis and Thunderstorm Model Simulations.
Technical Report, 1 May - 30 Apr. 1980.
W. R. Cotton, and G. J. Tripoli. 30 Jul 80, 25p
NASA-CR-163270
Grant NSG-5341, Contract NSF ATM-79-08297

Major research accomplishments which were achieved during the first year of the grant are summarized. The research concentrated in the following areas: (1) an examination of observational requirements for predicting convective storm development and intensity as suggested by recent numerical experiments; (2) interpretation of recent 3D numerical experiments with regard to the relationship between overshooting tops and surface wind gusts; (3) the development of software for emulating satellite-inferred cloud properties using 3D cloud model predicted data; and (4) the development of a conceptual/semi-quantitative model of eastward propagating, mesoscale convective complexes forming to the lee of the Rocky Mountains.

N80-26995/4 PC **A17/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
AVE-SESAME 2: The 25-Mb Sounding Data.
S. F. Williams, M. L. Gerhard, and R. E. Turner. Jun 80, 377p NASA-TM-78281

The rawinsonde sounding program for the AVE-SESAME II experiment is described. Data at 25 mb intervals from the surface to 25 mb for the 23 National Weather Service and 19 special stations participating in the experiment are presented. Soundings were taken at 3 hr intervals beginning at 1200 GMT on April 19, 1979, and ending at 1200 GMT on April 20, 1979 (nine sounding times). The method of processing is discussed briefly, estimates of the rms errors in the data presented, an example of contact data given, reasons given for the termination of soundings below 100 mb, and soundings listed which exhibit abnormal characteristics.

N80-26996/2 PC **A02/MF A01**
City Coll. of the City Univ. of New York.
Eigenvector Analysis of Some Observed and Model-Generated.
M. Dennis. Jul 80, 11p NASA-CR-163271
Contract NGR-33-013-066

An empirical orthogonal function analysis of monthly mean synoptic fields computed with a general circulation model and the corresponding observed climatological patterns is presented. A computer program was used to compute the principal components of the data matrices representing global maps of various observed and model-generated climatological fields. The variables analyzed were: 500mb geopotential height, 850 mb temperature, and sea level pressure. It is concluded that eigenvector analysis of observed and model-generated synoptic climatological fields is a useful diagnostic aid in the evaluation of global model simulation. The maps of any climatological variables are readily decomposed into a few orthogonal components which account for a large fraction of the total spatial variance, and the observed and model-generated patterns may then be compared in terms of these principal components of the original data matrices.

N80-26997/0 PC **A17/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
AVE-SESAME 3: 25-Mb Sounding Data.
S. T. Williams, M. L. Gerhard, L. P. Gilchrist, and R. E. Turner. Jun 80, 384p NASA-TM-78283

The rawinsonde sounding program for the AVE-SESAME 3 experiment is described and tabulated data at 25-mb intervals from the surface to 25 mb for the 23 National Weather Service and 19 special stations participating in the experiment are presented. Soundings were taken at 3 hr intervals beginning at 1200 GMT on April 25, 1979, and ending at 1200 GMT on April 26, 1979 (nine sounding times). The method of processing is discussed briefly, estimates of the rms errors in the data presented, an example of contact data given, reasons given for the termination of soundings below 100 mb, and soundings listed which exhibit abnormal characteristics.

N80-26998/8 PC **A08/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
ICEX: Ice and Climate Experiment. Report of Science and Applications Working Group.
Dec 79, 152p NASA-TM-81028

The Ice and Climate Experiment (ICEX), a proposed program of coordinated investigations of the ice and snow masses of the Earth (the 'cryosphere') is described. These investigations are to be carried out with the help of satellite, aircraft, and surface based observations. Measurements derived from the investigations will be applied to an understanding of the role of the cryosphere in the system that determines the Earth's climate, to a better prediction of the responses of the ice and snow to climatic change, to studies of the basic nature of ice forms and ice dynamics, and to the development of operational techniques for assisting such activities in the polar regions as transportation, exploitation of natural resources, and petroleum exploration and production. A high-inclination satellite system with a set of remote-sensing instruments specially tailored to the task of observing the important features of snow, sea ice, and the ice sheets of Greenland and the Antarctic is to be used to record the near-simultaneous observations of multiple geophysical parameters by complementary sensors.

N80-26999/6 PC **A04/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Exploratory Meeting on Airborne Doppler Lidar Wind Velocity Measurements.
G. H. Fichtel, J. W. Kaufman, and W. W. Vaughan. Apr 80, 57p NASA-CP-2140
Meeting Held in Huntsville, Ala., 1 Apr. 1980.

No abstract available.

N80-27045/7 PC **A06/MF A01**
Royal Netherlands Meteorological Inst., De Bilt.
Precipitation, 1978.
1979, 125p KNMI-117-79
Text in English and Dutch.

Daily precipitation data for the Netherlands during 1978 are listed by station. Averages were computed, and monthly and yearly summaries shown for each station. A map gives the location of each rain gauge.

N80-27046/5 PC **A02/MF A01**
Royal Netherlands Meteorological Inst., De Bilt.
A Vertically Detailed Analysis of Some Air Mass Properties.
G. J. Cats, and J. Reiff. 1979, 21p KNMI-V-329

A method for obtaining a detailed analysis of air mass properties such as temperature and humidity for use in isentropic trajectory models is described. The temperature and humidity of the advected air mass are analyzed as linear combinations of observed temperatures (respectively humidities) at nearby stations. The weights are taken proportional to the inverse of the square of the distance between air mass source and observation point. Since only at some levels the air mass source is known (namely at the trajectory levels), the weights are linearly interpolated between those levels. Some analysis examples are given.

N80-27047/3 PC **A03**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Bureau Vakopleidingen.
Wind Maxima in the Upper Boundary Layer, Winter 1978-1979 Windmaxima Aan de Bovenzijde van de Grenslag Gedurende de Winter van 1978-1979.
C. J. Vanderham. 1980, 33p KNMI-V-336
Text in Dutch.

A synoptic study of low level wind maxima was made for nocturnal, frontal and non frontal cases. Situations with glazed frost fronts seemed to favor the occurrence of maxima. Maxima were also frequent in situations with east winds in a shallow cold boundary layer. In a few cases, sea influences played a role.

N80-27048/1 PC **A02**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt.
A Convergence Analysis of a Numerical Method for Solving the Balance Equation.
S. J. Bijlsma, and R. J. Hoogendoorn. 1980, 18p
KNMI-WR-80-1

The convergence of an iterative method for solving the nonlinear balance is analyzed. It is shown that this iterative method will be convergent if sufficiently accurate initial approximation is used and if the subsequent iterates satisfy the ellipticity condition. Otherwise if the successive approximate solutions do not all satisfy the ellipticity condition the method may be divergent. Measures to make the method convergent in this case are described. Experimental results are given.

PAT-APPL-6-163 837 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Cloud Cover Sensor.
Patent Application,
E. G. Laue. Filed 27 Jun 80, 11p N80-26992/1, NASA-CASE-NPO-14936-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus is described which provides a numerical indication of the cloudiness at a particular time of a day. The apparatus includes a frame holding several light sensors such as photovoltaic cells, with a direct sensor mounted to directly face the Sun and indirect sensors mounted to face different portions of the sky not containing the Sun. A light shield guards the direct sensor from most of the sky except a small portion contining the Sun, and also shields each of the indirect sensors from direct sunlight. The relative values of the outputs from the direct and indirect sensors, enables the generation of a numerical indication of the degree of cloudiness at a particular time of day.

PB80-196942 PC **A03**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC. Meteorology and Assessment Div.
Experiments on Stably and Neutrally Stratified Flow Over a Model Three-Dimensional Hill.
Journal article,
J. C. R. Hunt, and William H. Snyder. 1980, 38p
EPA-600/J-80-025
Prepared in cooperation with Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics. Pub. in Jnl. of Fluid Mech., v98 pt4 p671-704 1980.

The flow structure over a bell shaped hill (reciprocal of a fourth order polynomial in cross section and height h) was studied in large and small stably stratified towing tanks (with uniform density gradients) and in an unstratified wind tunnel. Observations were made at Froude numbers F=U/(Nh) over the range 0.1 to 1.7 and at F=infinity (U is the towing speed and N is the Brunt-Vaisala frequency). For F greater than or equal to 0.4, the observations verify Drazins' (1961) theory for low Froude number flow over 3-dimensional obstacles and establish limits of applicability. For Froude numbers of order 1, the study shows that a classification of the lee wave patterns and separated flow regions observed in 2-dimensional flows also appears to apply to 3-dimensional hills. Flow visualization techniques were used extensively to produce both qualitative and quantitative information on the flow structure around the hill. Representative photographs of dye tracers, potassium permanganate dye streaks, shadowgraphs, surface dye smears, and hydrogen bubble patterns are included. While emphasis is centered on obtaining a basic understanding of flow around 3-dimensional hills, the results are applicable to estimating air pollutant dispersion around hills.

PB80-200041 PC **A03**/MF **A01**
National Weather Service Forecast Office, West Columbia, SC.
South Carolina Tornadoes 1977-79,
John C. Purvis. 1980, 32p NOAA-80053001
Prepared in cooperation with South Carolina Office of the Adjutant General, Columbia. Emergency Preparedness Div.

Although tornadoes are not a frequent phenomena, an average of about ten occur each year in South Carolina. During the interval 1956 through 1979, 230 tornadoes were reported in the Palmetto state. Tornadoes occur in every month of the year in South Carolina but are most frequent in spring and least frequent in winter. The months of April and May account for one-third of the total and about 70% come in the months of March, April, May and June. The outer coastal plain tends to have another maximum in August and September. Many of these are waterspouts or tornadoes which accompany tropical storms or hurricanes. A tabulation of tornadoes in South Carolina during the period 1977-79 is presented giving the date, county and a description of the tornado.

PB80-201130 PC **A19**/MF **A01**
National Weather Service, Washington, DC. Climate Analysis Center.
Proceedings of the Annual Climate Diagnostics Workshop (4th) Held at Madison, Wisconsin on October 16-18, 1979,
Jay S. Winston. Mar 80, 450p NOAA-S/T-80-150, NOAA-80060201
See also report on 2nd Workshop dated Oct 77, PB-282 151.

The Workshop concentrated principally on reports of a variety of climate diagnostic studies of the observed atmosphere and of model atmospheres. Also emphasized were the program of the Climate Analysis Center (CAC) and the selection of indices and analyzed fields for inclusion in a real-time diagnostics data base at CAC. Some of the opportunities as well as the problems involved in using the National Meteorological Center (NMC) and National Environmental Satellite Service (NESS) data bases for climate analysis were treated. A special topic for this year, volcanic activity and climate was addressed in two papers.

PB80-202310 PC **A17**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Atmospheric Physics and Chemistry Laboratory Collected Reprints 1974-75.
Apr 76, 376p NOAA-76060107
See also report dated 1973, COM-75-10857, and report dated 1972-73, COM-75-10471.

This book is a compilation of a variety of reprints from other sources of subjects related to meteorology. The reprints included, are listed in the table of contents alphabetically according to author. The subjects discussed cover a wide variety of meteorological data.

PB80-204027 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Federal Coordinator for Meteorological Services and Supporting Research.
National Hurricane Operations Plan.
May 80, 68p FCM-80-2, NOAA-80052908
See also report dated Mar 80, PB80-187362.

The Hurricane Warning Service is an interdepartmental effort to provide the Nation and designated international recipients with environmental data, forecasts, and assessments concerning tropical and subtropical weather systems. Interdepartmental cooperation achieves economy and efficiency in the operation of the Hurricane Warning Service. This plan provides the basis for implementing the agreements of the Department of Commerce (DOC), Department of Defense (DOD), and the Department of Transportation (DOT) reached at the annual Interdepartment Hurricane Warning Conference (combined Atlantic and Pacific).

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A085 884/5 PC **A08**/MF **A01**
Army Armament Materiel Readiness Command Rock Island IL Program Analysis and Evaluation Directorate
Program Analysis and Evaluation Directorate Activities Summary. Volume II.
Final rept.
Apr 80, 165p Rept no. DRSAR/PE/N-84-VOL-2
See also Volume 1, AD-A085 943.

This report contains five Memoranda for Record (MFRs) representing some of the activities of the Program Analysis and Evaluation Directorate, US Army Armament Materiel Readiness Command, Rock Island, IL 61299. Subjects dealt with are the systems analysis of cannon damage in the M110/M110AI systems and an approximation for the standard cumulative production cost using learning theory. (Author)

AD-A085 889/4 MF **A01**
Department of Defense Washington DC
Department of Defense Reorganization Study Project. Departmental Headquarters Study. A Report to the Secretary of Defense.
1 Jun 78, 10p
Availability: Microfiche copies only.

This report is concerned with Defense Management Structure. The issue is focused on: (1) The relative roles and responsibilities of the Office of the Secretary of Defense and the Office of the Joint Chiefs of Staff; the Service Secretaries and the Military Department Staffs (including the Service Chiefs of Staff), and the interrelationships of these staffs; (2) The organization of the Office of the Secretary of Defense to make sure he can exercise control over both operating forces and defense resources; to develop and implement long-range national security plans consistent with national policies and goals; to evaluate current and new defense systems to ensure readiness, adherence to performance standards, and compatibility with other programs; (3) The organization, authority, and capability of the Service Secretaries to exercise their responsibilities as resource managers; (4) The ability of the Joint Chiefs of Staff simultaneously to provide effective advice to the President and the Secretary of Defense, to participate in resource management activities and in the operational command chain, and to function without conflict as both individual Service Chiefs and as members of the Joint Chiefs of Staff; and (5) The ability of the Military Department staffs to simultaneously manage resources and support their respective Service Chiefs in their roles as members of the Joint Chiefs of Staff.

AD-A085 988/4 PC **A05**/MF **A01**
Army Missile Command Redstone Arsenal AL Technology Integration Office
Research and Development Project Prioritization. An Annotated Bibliography.
Management rept.,
Edward B. Dobbins, Jr. Apr 80, 97p Rept no. DRSMI/RN-80-1

This report is based upon research concerned with the aggregation of multiple lists of rank-ordered re-

search and development (R&D) projects or product requirements needing R&D. The resultant prioritized list serves as a basis for resource allocation to the R&D projects. The rank orders are ordinal and without feedback or strategy. The extensive literature of this field of study – social choice – is structured and analyzed. A companion document, an Industrial Engineering Management Dissertation by Dobbins, builds upon the literature foundation to classify the known majority-rule aggregation methods, evaluate them, and develop a model and computer code using the better methods to compute the aggregation of up to 100 rank-ordered lists of up to 100 alternatives.

AD-A085 991/8 MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Interagency/Intergovernmental Coordination for Environmental Planning (IICEP): Systems Considerations.
Technical rept.,
Ronald Dwight Webster, and D. E. Putnam. May 80, 107p Rept no. CERL-TR-N-87
Availability: Microfiche copies only.

The primary purpose of this report is to document the organization and command structure of a computerized system for providing access to information necessary for the Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) requirements as set forth in Air Force Environmental Planning Bulletin 14. A secondary objective is to identify problems associated with the IICEP system's implementation and to recommend pertinent solutions. Preliminary data acquired by Air Force contractors were obtained and used as a basis for developing the software structure necessary to handle these data. This report describes IICEP and explains the development of the organization, structure, and software of the pilot computerized system. It will form the basis for evaluating the system and further clarifying the need for data refinement and update. (Author)

AD-A086 014/8 PC **A14**/MF **A01**
Department of Defense Washington DC
The FY 1981 Department of Defense Program for Research, Development, and Acquisition.
1 Feb 80, 303p
Statement by the Honorable William J. Perry, Under Secretary of Defense Research and Engineering of the 96th Congress, second session.

The challenge a head is formidable. We are behind quantitatively in deployed equipment and are falling further behind because of disparities in equipment production rates. While we are still ahead in defense technology, we are in danger of losing that advantage because of massive Soviet spending in defense R&D. But we also have some distinctive advantages: a superior technological base, a competitive industry with greater productivity, and allies with a substantial industrial capability. In order to meet the formidable challenge we face, our investment strategy must fully exploit these substantial advantages. Our overriding near term need is to get on with the modernization of our forces. Our technology is of little to our armed forces when it is not embodied in operational equipment. Most of our ground forces weapon systems now deployed--our main battle tank, our armored personnel carrier, our air defense gun missile, our attack helicopter--were developed during the fifties and entered production in the sixties. As a consequence they simply do not incorporate current technology, and they provide maintenance and support problems created by their age. (Author)

AD-A086 015/5 PC **A04**/MF **A01**
Department of Defense Washington DC
The Department of Defense Statement on the Science and Technology Program,
Arden L. Bement, Jr. 5 Mar 80, 61p

Requirements that must be addressed by technical solutions include: improved reliability (which is 'designed-in' and 'manufactured-in' not just 'tested-in'); life extension and durability of costly military hardware; conservation, substitution, and recycling technologies for critical materials; increased productivity and reduced manufacturing costs in our defense industrial base; the capability to substitute synthetic fuels for petroleum-based fuels; and improved human engineering to better match operational demands of new equipment to training and readiness levels. Advanced Technology Developments and the Manufacturing Technology Program provide great potential for meeting these requirements and accordingly deserve stronger emphasis in the future than is represented in our FY 1981 budget request. (Author)

AD-A086 059/3 PC **A08**/MF **A01**
Decisions and Designs Inc McLean VA
QVAL and GENTREE: Two Approaches to Problem Structuring in Decision Aids.
Technical rept.,
Jonathan J. Weiss. Apr 80, 157p Rept no. TR-80-3-97
Contract N00014-79-C-0068, ARPA Order-3668

Decision analysis is a technology which offers the decision maker a logical structure for solving a specific problem. Through the process of decision analysis, the decision maker may select from several options the one that best suits his/her needs. In practical applications, most decision analytic techniques require a specially trained decision analyst and a sizeable amount of time and expense. This report describes two computer-assisted decision aids which are designed to perform preliminary decision analyses in the absence of a professional decision analyst and for a restricted set of decision problems. The first decision aid, QVAL (Quick Evaluation), has been implemented on an IBM 5110 portable computer and is ready for operation on an experimental basis. QVAL is an interactive program designed to probe the user's memory for a complete set of attributes together with the scores and weights for a consistent evaluation of a set of options. The second decision aid, GenTree (Generic Tree Structuring), is still in the planning stage, but promises to be very valuable in storing experience and knowledge gained while working on problems and applying it to guide the analysis of subsequent ones. By utilizing prior knowledge stored in the GenTree database, this decision aid would approximate the performance of a decision analyst on familiar problem types. In contrast, QVAL would more resemble the performance of the decision analyst on a completely new application area. With the continuing progress being made in the fields of artificial intelligence and interactive computer graphics, more sophisticated computer-assisted decision aids of this nature may be designed.

AD-A086 209/4 PC **A04**/MF **A01**
Wisconsin Univ-Madison
An Instructional Management Guide to Cost Effective Decision Making,
Robert H. Pearson. 1974, 70p Rept no. TR73-11-1

The purpose of the study is to identify the differences in the cost-effectiveness analysis methods so that the most appropriate one could be selected as a decision-assisting aid for instructional management. The principal phases of the study are organized to explore and identify what cost-effectiveness methods are being used; to identify and examine the differences among the methods in an analytical framework; and, to determine the criteria to be used in selecting the most appropriate cost-effectiveness method for instructional decision-making. The emphasis of the study is on the performance of cost-effectiveness analysis as a service in support of the decision-making process by someone other than the instructional management. The descriptive detail provided in the study is such that an analyst with moderate experience could perform the indicated activities. The results of study suggest that cost-effectiveness analysis provides answers by a systematic process which is reproduceable and accessible to critical examination. On the other hand, cost-effectiveness analysis cannot be a substitute for judgment in decision-making by inductive reasoning which is fully documented. It is believed that use of instructional cost-effectiveness will enhance the possibility that a decision will result in the selection of the better (or best) alternative.

AD-A086 243/3 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Graduate School of Industrial Administration
Quality of Work Projects in the 1980's.
Interim rept. 1 May 79-30 Apr 81,
Paul S. Goodman. Jun 79, 27p Rept no. 2
Contract N00014-79-C-0167
Presented at IRRA Spring Meeting 1980, Philadelphia, PA.

This paper first examines factors that affect the long run viability of Quality of Working Life projects. Then it proposes some alternative structures for Quality of Working Life projects in the 1980's. (Author)

N80-27221/4 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Engineering Economic Systems.
Government Patent Policy: An Analysis of the Effects of Three Alternative Patent Policies on Technology of Goverment Inventions.
M. Matousek. Oct 79, 39p NASA-CR-163283, SU-27
Contract NASW-3204

The effects of present and proposed Government patent policies on the process of technology transfer and the commercialization of inventions resulting from Government sponsored research are addressed. The function of the patent system in Government research and the value of patents resulting from government sponsored research are examined. Three alternative patent policies, title in the contractor, title in the Government, and the waiver policy, are examined in terms of their effect on the commercialization of inventions, industrial competitions, disclosure of inventions, participation of research contractors and administrative costs. Efforts to reform the present Government patent policy are also described.

PB80-197270 PC **A02**/MF **A01**
Small Business Administration, Washington, DC. Office of Economic Research.
Small Business Economic Research Program Announcement.
31 Aug 79, 11p

The Office of Economic Research of the Chief Counsel for Advocacy will provide up to $1 million in Fiscal Year 1979 for grants, cooperative agreements and contracts to promote an extramural small business economic research program. Unsolicited proposals will be accepted and reviewed for any topics on small business economic research which deals (1) with the effects of Government programs, policies and regulations on small business, (2) the contribution of small business to the economic and social welfare of the United States and (3) the development of theories or methodology useful in studying small business problems. Research projects should be policy oriented to develop alternative approaches to solving small business problems.

PB80-197528 PC **A15**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Effects of Federal Transportation Funding Policies and Structures. Final Report (Appendix A through F).
Final rept. Apr 77-Dec 79,
Alan L. Porter, Choon Y. Park, Loren P. Rees, Terry Connolly, and Srikanth Rao. Dec 79, 329p DOT-P-10-80-09
Contract DOT-OS-70036
See also report dated Dec 79, PB80-197536. Prepared in cooperation with Pennsylvania State Univ., University Park.

The study focuses on the effects of Federal funding policies and structures of transportation investment. Several recent policy developments in highways, airports, and transit were analyzed toward this end. Procedurally, the work progressed by performing six discrete transportation analyses and then drawing together insights gained from these to suggest basic funding principles. These principles are then investigated through interviews on the 1978 Surface Transportation Act with 21 transportation professionals.

PB80-197536 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Effects of Federal Transportation Funding Policies and Structures. Overview.
Final rept. Apr 77-Dec 79,
Alan L. Porter, Choon Y. Park, Loren P. Rees, Terry Connolly, and Srikanth Rao. Dec 79, 90p DOT-P-10-80-10

Contract DOT-OS-70036
See also report dated Dec 79, PB80-197528. Prepared in cooperation with Pennsylvania State Univ., University Park.

The study focused on the effects of Federal funding policies and structures of transportation investment. Several recent policy developments in highways, airports, and transit were analyzed toward this end. The underlying philosophy is presented in the Overview Report.

PB80-198070 PC A04/MF A01
General Accounting Office, Washington, DC. Community and Economic Development Div.
Managerial Changes Needed to Speed Up Processing Permits for Dredging Projects.
Report to the House Committee on Merchant Marine and Fisheries.
9 Jun 80, 75p CED-80-71

The current process for issuing Army Corps of Engineers dredging permits is complex and lengthy. Since many steps are invoived in the process and the applications are reviewed by several agencies with differing goals and responsibilities, delays may occur at many points. The Corps, the environmental agencies, and the applicants share responsibility for lengthy permit processing. Dredging permits can be processed faster. Although processing time depends to a large extent on the complexity of the environmental issues, the Corps and other Federal agencies can reduce processing time by (1) establishing specific criteria for approving time extensions; (2) highlighting the Corps' and the Federal agencies' performance in meeting time frames through periodic reports; and (3) more clearly delineating specific areas of review for each agency.

PB80-199391 PC A04/MF A01
Pacific Northwest River Basins Commission, Vancouver, WA.
Power Planning Organizations in the Pacific Northwest.
Jul 78, 58p

Electric power planning requires historical data and forecasts of future loads and resources. A number of organizations provide background information on loads and resources and make studies of future conditions for certain designated geographic areas in the Pacific Northwest. These 'power areas' differ in their geographical boundaries, load-serving capabilities and purposes. The report discusses some of the organizations, reviews their power planning activities, and identifies their power areas.

PB80-199441 PC A06/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
NBS/AID/PCSIR (Pakistan Council of Scientific and Industrial Research) Survey on Standardization and Measurement Services in Pakistan.
Final rept.,
H. Steffen Peiser, Theodore M. Manakas, and Penelope M. Odar. Jun 80, 116p NBSIR-80-2051
Grant PASA-TA(CE)-5-71

Following similar projects conducted by the National Bureau of Standards in other countries, the Ministry of Science and Technology of Pakistan and under it the Pakistan Council of Scientific and Industrial Research invited NBS to organize a six-man international team of experts in selected topics of metrology to advise on the adequacy and needs for standards and measurement services and to comment upon the plan to establish a new laboratory in Islamabad which would be the primary national standards body under the title of National Physical and Standards Laboratory. The team strongly endorsed the NPSL plan, having found every indication that a national focal point for good measurements appeared as a critical need for Pakistan's development. A summarizing letter of conclusions and recommendations is reproduced with other recommendations and relative remarks by visiting team members (Section III). For readers not familiar with Pakistan, Sections V and VI give some background on science and technology in Pakistan.

PB80-199474 PC A04/MF A01
SRI International, Arlington, VA. Strategic Studies Center.
The Planning and Management of Industrial Research and Development in the U.S.S.R. Report on December 1979 U.S. Team Visit in U.S.S.R.
Final rept.,
Morris Bornstein, Charles F. Larson, Louvan E. Nolting, Francis W. Rushing, and Samuel W. Tinsley. Jun 80, 73p SSC-TN-7557-7, NSF/INT-78-18699-TO1A
Contract NSF-INT78-18699

The trip report is based on the notes of members of a five-person U.S. team of specialists on industrial R&D who visited the Soviet Union in December 1979 under the auspices of the U.S.-U.S.S.R. Science Policy Working Group. The primary goal of the visit was to assess the impact of innovative changes in the R&D planning and management in the U.S.S.R. Ministry of Instrument Making, Automation Equipment, and Control Systems (Minpribor). The team visited two Scientific Production Associations in Leningrad and Tbilisi as well as the Institute of Control Problems, Minpribor headquarters, and the State Committee on Science and Technology, all in Moscow.

PB80-813165 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Technology Assessment. August, 1977-1978 (Citations from the NTIS Data Base).
Rept. for Aug 77-1978,
Mary E. Young. Jul 80, 267p
Supersedes NTIS/PS-79/0841 and NTIS/PS-78/0831. See also 1964-June, 1975, NTIS/PS-76/0482 and July, 1975-July, 1977, NTIS/PS-78/0830.

The bibliography cites references concerning the assessment of technology in a wide variety of fields from social to the physical sciences. The majority of the references are in the applied physical sciences, including energy. Theoretical and applied studies are covered. (This updated bibliography contains 262 citations, none of which are new entries to the previous edition.)

PB80-813173 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Technology Assessment. 1979-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jul 80,
Mary E. Young. Jul 80, 155p
Supersedes NTIS/PS-79/0841 and NTIS/PS-78/0831. See also 1964-June, 1975, NTIS/PS-76/0482 and July, 1975-July, 1977, NTIS/PS-78/0830.

The bibliography cites references concerning the assessment of technology in a wide variety of fields from social to the physical sciences. The majority of the references are in the applied physical sciences, including energy. Theoretical and applied studies are covered. (This updated bibliography contains 150 citations, 94 of which are new entries to the previous edition.)

5B. Documentation and Information Technology

AD-A085 934/8 PC A02/MF A01
Young (Arthur) and Co Washington DC
The Design of an Information Management Program for Headquarters, Department of the Army. Study Synopsis.
Contract study, Oct 78-Feb 80.
13 Feb 80, 7p
Contract MDA903-78-C-0483
See also AD-A085 935.

The synopsis addressed the situations in which the Army staff has applied information management in various situations, how the Information Resource Management (IRM), concept can be applied to the Army's situation, and provides recommended organizational model for HQDA (overall) and its functional staff agencies for managing information as a resource. (Author)

AD-A085 935/5 PC A03/MF A01
Young (Arthur) and Co Washington DC
The Design of an Information Management Progam for Headquarters, Department of the Army. Phase 2. Management Summary.
Contract study, Aug 78-Feb 80.
26 Feb 80, 30p
Contract MDA903-78-C-0483
See also AD-A085 936.

The report summarizes the Phase 2 detailed report. Included are automated information problems, principles of managing information as a resource, benefits of IRM. Also contained are the study's 10 recommendations, IRM program resource requirements, and proposed organizational models for implementing the distributed IRM program at HQDA. (Author)

AD-A085 936/3 PC A10/MF A01
Young (Arthur) and Co Washington DC
The Design of an Information Management Program for Headquarters, Department of the Army. Phase 2. Detailed Report.
Final rept. 1 Aug 79-26 Feb 80.
26 Feb 80, 216p
Contract MDA903-78-C-0483
See also AD-A085 934.

The basic question addressed in Phase 2 of the study is the development of policies, detailed procedures, a proposed organizational design, and a micro-level implementation milestone plan for implementation of the distributed IRM program for management of automated information at Headquarters, Department of the Army (HQDA). The study develops nine policy concepts for information management. The functions of the eleven IRM functional programs are completely developed. A methodology for costing information is developed. An information system for internal management of IRM, the Information Resource Information System is fully specified. Organizational design to include designation of required personnel resources by type are included for each distributed organizational element. IRM program cost estimates are also included. The study recommends that the IRM Resource Management Office which manages the overall programs be established at the highest levels of HQDA in Office, Chief of Staff directly reporting to Director of the Army Staff. Ten of the eleven IRM functions are distributed to three major Army staff elements. (Author)

AD-A086 024/7 PC A04/MF A01
Office of Naval Research London (England)
European Scientific Notes. Volume 34, Number 4,
Willard D. Bascom, and Don J. Peters. 30 Apr 80, 54p Rept no. ESN-34-4

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A086 055/1 PC A07/MF A01
Sterling Systems Inc McLean VA
Baseline Description and Analysis of the Operations Related to Warehouse Controlled Documents at the Navy Publications and Forms Center, Philadelphia, Pennsylvania. Volume I. Phase I.
Final rept. Oct 78-Mar 80,
Dev R. Chaudhari, and Arthur H. Radford. 6 Mar 80, 137p Rept no. 1604-VOL-1
Contract N00167-78-C-0101
See also Volume 2, AD-A086 056.

This study documents a baseline description and analysis of operations at the Navy Publications and Forms Center (NPFC) associated with the management of warehouse controlled documents. The study was conducted in two phases. Phase I (documented in Volume I) focused on: functional description of NPFC operations, estimation of demand for NPFC services by document and customer categories, analysis of procurement activities, and description of the physical characteristics

of the stocked documents. Phase II (documented in Volume II) focused on: development of the cost and volume estimates for NPFC and printing support operations, estimation of the number of line items stocked by NPFC by document category, geographic distribution of document demand, document cancellations and disposal activities, and NPFC interface with Document Preparing Activities. (Author)

AD-A086 056/9 PC **A06/MF A01**
Sterling Systems Inc McLean VA
Baseline Description and Analysis of the Operations Related to Warehouse Controlled Documents at the Navy Publications and Forms Center, Philadelphia, Pennsylvania. Volume II. Phase II.
Final rept. Oct 78-Mar 80,
Dev R. Chaudhari, Arvin R. Krishna, and Arthur H. Radford. 6 Mar 80, 119p Rept no. 1604-VOL-2
Contract N00167-78-C-0101
See also Volume 1, AD-A086 055.

This study documents a baseline description and analysis of operations at the Navy Publications and Forms Center (NPFC) associated with the management of warehouse controlled documents. The study was conducted in two phases.Phase I (documented in Volume I) focused on: functional description of NPFC operations, estimation of demand for NPFC services by document and customer categories, analysis of procurement activities, and description of the physical characteristics of the stocked documents. Phase II (documented in Volume II) focused on: development of the cost and volume estimates for NPFC and printing support operations, estimation of the number of line items stocked by NPFC by document category, geographic distribution of document demand, document cancellations and disposal activities, and NPFC interface with Document Preparing Activities. (Author)

AD-A086 088/2 PC **A04/MF A01**
Air Force Weapons Lab Kirtland AFB NM
AFWL Standards for Scientific and Technical Reports.
Final rept.,
Althea R. Guist, and Dolores C. Devlin. Apr 80, 74p AFWL-TR-80-999, AD-E200 486
Supersedes Rept. No. AFWL-TR-79-999, AD-A069 197.

This report implements MIL-STD-847A and presents the standards for preparing, editing, reproducing, and distributing Technical Reports for the Air Force Weapons Laboratory. Its purpose is to standardize details for clarity, uniformity, and consistency and thus reduce the costs of publication. Format samples follow immediately after instructions. These standards are intended to be used for reference in specific areas and need not be read from cover to cover. An index is included to aid the reader in finding the specific areas of interest.

AD-A086 168/2 PC **A04/MF A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 34. Number 5,
Richard S. Hughes, and Don J. Peters. 31 May 80, 55p Rept no. ESN-34-5

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A086 177/3 MF **A01**
Coast Guard Washington DC Office of Research and Development
United States Coast Guard Technical Reports 1970 - 1979. Subject Index.
May 80, 95p Rept no. USCG-D-35-80
Availability: Microfiche copies only.

This subject index contains all United States Coast Guard technical reports prepared during the period January 1970 through December 1979. They are available to the public through the National Technical Information Service. It should be kept in mind that this index lists only Coast Guard reports sent to NTIS after 1 January 1970 and does not list classified reports or reports sent to NTIS after 31 December 1979. (Author)

ED-176 726 Not available NTIS
Library Sign Systems. Workshop Program Materials,
Patricia M. Ridgeway. 19 Apr 79, 11p
Materials developed for the South Carolina Library Association: Public Services Section Workshop, Columbia, SC. on April 19, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

These program materials from the Library Sign Systems Workshop include a news story on the workshop; notes in outline form for a speech presented by Joe Sonderman, president of a graphic designs firm; and an annotated bibliography on signs and sign systems. The news release summarizes a presentation by Dorothy Pollet and Peter Haskell, editors of 'Sign Systems for Libraries', who asserted that all library patrons have the right to find their own way around the library through the use of a good signage program and that many signs are used that make libraries appear amateurish, intimidating, and bureaucratic. Pollet then illustrated ways librarians can analyze signage needs, using mock-ups and models to test solutions. Sonderman addressed the participation of graphic designers and stressed the need for a good manual in design systems. The outline of his speech covers design process, planning the graphics, sign categories, materials and methods, special techniques, decision factors, and service provided by design consultants.

ED-176 727 Not available NTIS
Nebraska Library Trustee Association.
Nebraska Library Trustee Manual.
1977, 29p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This manual provides basic information for Nebraska library trustees concerning a good library, qualifications of trustees, duties of trustees, the library policy, book selection policy, the business of the board, Nebraska Library networks, statewide library development, the Nebraska Library Commission, friends of the library, organizations and conferences, the library Bill of Rights, and recommended books and periodicals. Appendices outline the organization of new trustees and the bylaws of the Nebraska Library Trustee Association and mention laws relating to library trustees.

ED-176 728 Not available NTIS
A New Catalog: Some Ideas on Its Purpose, Form, Cost, and Planning for It,
Neal K. Kaske. 3 Apr 79, 27p
Paper presented to the New England Technical Services Libraries Section of the New England Library Association, South Hadley, MA. on April 3, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Ideas and methods for improving library service through changes in library catalogs are presented and discussed. These ideas and methods are in four basic areas: (1) methods for evaluating a library's current catalog(s); (2) costing different forms of the catalog; (3) examining the effects on an individual library's catalog(s) of Anglo-American Cataloging Rules II (AACR II) and the closing of its catalog by the Library of Congress (LC); (4) managing and planning for the changes resulting from AACR II, closing of the LC catalog, and changing the form of catalogs in individual libraries. Examples of all the methods are provided.

ED-176 729 Not available NTIS
New York State Dept. of Education, Albany.
New York State Library Data Base Users Manual.
1979, 31p
Prepared in cooperation with New York State Library, Albany.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This manual is intended to provide users with a description of the information required by the New York State Library to adequately process a database search. Sections cover computer searching, what it and its advantages are; topic suitability; turnaround time for receipt of a database printout; reference interview to determine search topic; searching tools; success and failure factors of a database search; cost of searching; receipt of citations; and Boolean logic (how the search analyst formulates a search). Appendices present the content, scope, and charges for database use through the State Library, and outline the procedures for submitting requests by teletype--for data base searches through the New York States Interlibrary Loan Network (NYSILL)--or by mail through the State Library. Also included are sample database search request forms (NYSILL and mail) and addresses where further questions may be directed.

ED-176 730 Not available NTIS
Off-Campus Library Services: Those In-between Years,
Aline Soules. 1978, 21p
Paper presented at the National Conference of the Association of College and Research Libraries (1st, Boston, MA. on November 8-11, 1978.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper discusses the library services that complement growing university and college off-campus programs and specifically centers on the years that fall between the start of such services and the final establishment of a physical satellite library. Suggestions, drawn partly from the literature and primarily from experiences at the University of Windsor, are offered for the handling and future development of these library services.

ED-176 731 Not available NTIS
American Library Association, Chicago, IL.
Organizing and Managing a Library Instruction Program. Checklists,
Anne Roberts. Jun 79, 35p
Prepared in cooperation with Association of Coll. and Research Libraries, Chicago, IL. American Library Association Preconference, held at Dallas, TX. on June 21-23, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Intended to help academic librarians with practical information useful in the development of their own programs, these 12 checklists cover appropriate segments of the academic library instruction program: (1) elements of a model library instruction program; (2) assessing student needs; (3) assessing classroom instructor interest in bibliographic instruction through an interview; (4) assessing the dean's interest in bibliographic instruction through an interview; (5) administering a program; (6) developing objectives; (7) instructional modes; (8) developing instructional materials; (9) program to teach librarians how to teach; (10) evaluation of a program; (11) gaining and maintaining collegial support within the library; and (12) gaining and maintaining institutional support.

ED-176 732 Not available NTIS
Wisconsin State Dept. of Public Instruction, Madison. Div. of Library Services.
Organizing Wisconsin Public Documents: Cataloging and Classification of Documents at the State Historical Society Library,
Alice Alderman. Aug 74, 85p WSDPI-5075
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Devised for the classification of the documents of all the states and territories and Canadian provinces, of Wisconsin county and municipal publications, and of documents which derive from inter-

state compacts, this guide outlines a cataloging procedure and a classification scheme that can be expanded to apply to the documents of other countries and the publications of private firms and institutions. Sections are devoted to cataloging, location symbols, classification by call number, outline of agency records (Schellenberg theory), outline of classification scheme, agency codes, and advantages of the scheme. A bibliography on the cataloging and classification of public documents is also included.

ED-176 733 Not available NTIS
Virginia State Council of Higher Education, Richmond.
A Plan for Library Support of Off-Campus Continuing Education Courses,
Gerard B. McCabe, and Connor D. Tjarks. Mar 79, 64p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Based on cooperation of public and academic libraries, the basic plan for library support of off-campus continuing education credit courses presented in this report provides for outright donation or long term deposits of library materials by libraries of teaching institutions to host libraries, usually public libraries located in areas where courses are being taught; it is intended for the libraries in the Richmond area. Included are narratives of site visits that were made to libraries in North Carolina, Virginia, Louisiana, Mississippi, Alabama, New York, Pennsylvania, and Iowa, as well as a summary of telephone conversations with librarians with continuing education responsibility in Maryland and Pennsylvania.

ED-176 741 Not available NTIS
Tennessee State Library and Archives, Nashville.
Handbook for Public Library Boards of Trustees.
1973, 46p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This handbook for Tennessee library boards of trustees has five major sections: (1) public library laws of Tennessee; (2) public library services in Tennessee, including those of the Tennessee State Library and Archives and the Tennessee regional library system, (3) the library board of trustees, (4) library staff, and (5) library services. Also provided are sample by-laws, policies of the library board, the American Library Association Library Bill of Rights, and a Freedom to Read statement.

ED-176 743 Not available NTIS
Nebraska Library Commission, Lincoln.
A Report on Serials List Activity in Nebraska's Metropolitan Library Network Area,
Carol Dick Buell. 1979, 49p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report summarizes the results of a survey of the 91 libraries--public, special, academic, and school--in the Metropolitan Library Network of Nebraska concerning their serials activity: what union lists were extant in the network area, how those union lists were used in network libraries, and what area librarians would like to see in any future Nebraska union lists. Specific topics covered include the response rate to the questionnaires, serials activity, serials lists in the network area, use of serials lists, and the need expressed for union list activity in the network area. Statistical tables are provided for each topic, and a summary of the findings together with recommendations concludes the report. Appendices include a map of Nebraska library networks, the two questionnaires used in the study, a list of respondents, and a bibliography of sources consulted.

ED-176 744 Not available NTIS
California Univ., Los Angeles.
The Role and Problems of Libraries in Developing Countries: The West African Experience.
Master's thesis,
Mary Stutzman. 19 May 78, 117p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Using the situation in West Africa as an example, this paper examines the role and the problems of libraries in developing countries; a problem approach, rather than a country-by-country survey, has been employed. The paper is divided into three major sectons: (1) a review of colonial influence, discussing British and French attitudes towards education and libraries and the effect which these attitudes had on the institutions established by the colonial powers in Africa, (2) an examination of the role of the library in the overall development of a country, emphasizing the need for national planning and the integration of library and educational programs; (3) a discussion of the problems facing all types of libraries in West Africa, including staffing, the scarcity of resources, and the need to develop a supportive national bibliographic apparatus. A lengthy bibliography is provided.

ED-176 745 Not available NTIS
School/Public Library Cooperation,
Robert Winters. 1978, 8p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Bibliographic citations and annotations are provided for 54 publications related to public library-school library cooperation; the period covered is May 1972 to January 1978.

ED-176 746 Not available NTIS
South Carolina State Library, Columbia.
South Carolina Speaks Up for Libraries. Report of the Governor's Conference on Library and Information Services.
Mar 79, 33p
Governor's Conference on Library and Information Services, Columbia, SC. on March 15-17, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The 49 resolutions proposing local, state, and national action that form the basis of this report are grouped in six library and information issue-areas: funding, cooperation, access, resources and service, public relations, and education. Other sections of the report describe both pre- and conference activity. Included are South Carolina Governor Richard W. Riley's address to the conference delegates, the keynote speech of New York State Senator Major. R. Owens, short biographical sketches of the delegates chosen to represent South Carolina at the White House Conference for Library and Information Services, and a list of delegate attendees.

ED-176 747 Not available NTIS
Pennsylvania State Univ., University Park. Univ. Libraries.
Subject Index to Collections in the Microforms Section,
Jack E. Pontius. 1979, 129p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, Va. 22210.

This document is a subject index to the microform (microfilm, microfiche, superfiche, COM, microopaques) collections of the Pattee Library of Pennsylvania State University. Collections are listed under both general and specific subject headings and are identified by main entry, title, and microform call number.

ED-176 748 Not available NTIS
Utah State Library Commission, Salt Lake City.
Utah Public Library Trustee Handbook
1979, 25p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to answer basic questions and to assist the Utah public library trustee in the performance of his duties, this handbook's brief, informative sections cover efficiency guidelines, policies and procedures, standards, money, personnel services, travel costs, operations, capital outlay, trustee checklist, job description for librarian, Utah State Library services, and Utah's laws for libraries.

ED-176 749 Not available NTIS
Kegoayah Kozga Library Association, Nome, AK.
Village Library Project, Nome, Alaska. An Evaluation, 1979,
Phyllis T. Dalton. 1979, 52p
Sponsored in part by Alaska Div. of State Libraries, Juneau.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The adequacy of the Village Library Project, headquartered in Nome, Alaska, to meet the library service needs and desires of the prople in 18 villages on Seward Peninsula, St. Lawrence Island, and Diomede is evaluated in this report. Sections are devoted to the goals of the evaluation, evaluation procedure, goals and objectives of the project, project activities, attainment of stated goals and objectives, additional criteria, and conclusions and recommendations. Appendices provide profiles of the project and the village libraries, circulation statistics for the project (1977-78), a list of non-fiction books purchased (1977-78), a summary of alternate approaches to village library service in the Nome area, a mileage map of the project's service area, and selected references.

ED-176 750 Not available NTIS
Wisconsin State Dept. of Public Instruction, Madison. Div. of Library Services.
Wisconsin Authors and Their Books, 1836-1975. A Compilation of Wisconsin Authors and Their Books, 1836-1975 Including Titles from Earlier Bibliographies,
Orrilla T. Blackshear. 1976, 659p WSDPI-7100
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Approximately 5100 Wisconsin authors--defined as having had residence in the state and having published one or more books--are listed in this bibliography. The list is alphabetical by name of author; each author entry includes, where possible, birth and death dates, state locations with which the author was most frequently associated, and a record (in chronological order by publication dates) of the books written and published by the author. Categories of books not included in this listing are single speeches or lectures, publications of fraternal orders, single magazine or newspaper articles, graduate theses and dissertations, sermons, and state and federal government documents.

ED-176 751 Not available NTIS
Women's Studies: A Bibliographic Essay,
Monika Kirtland. 1978, 39p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The essay section provides a definition and short history of women's studies and explores the implications in regard to the administration and teaching of such courses. The bibliography lists and annotates material useful for all levels of education. Information sources covered include government agencies and societies, reference sources (such as guides to the field, bibliographies, indexes, directories, data bases), books, journals, articles, and publishers.

ED-176 752 Not available NTIS
Chicago Public Library, IL.
The Writing-in-Chicago Program of the Chicago Public Library. An Evaluation,
W. Boyd Rayward. 1979, 90p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

An experimental writing program lasting three years and four months was held in the Chicago Public Library System, for which writers-in-residence, scholars-in-residence, and other program associates presented several series focusing on the city of Chicago. Emphasis during the first year centered on the literary/historical aspect of writing in and about Chicago, and later expanded to include the process of writing in specific genres, as well as the work of special groups. Although differing opinions and emphases on administrative details were evidenced between project and branch staffs, participants in the Writing-in-Chicago Program were very enthusiastic, used the library and

cultural center more, and traveled a longer distance to attend sessions than participants in other programs. A narrative account of the program, description of academic components, learner questionnaire, interview guides, and relevant correspondence are appended.

ED-176 753 Not available NTIS
Africa Bibliographic Centre(APC): An Experiment in African Documentation and Library Resource Sharing,
O. C. Mascarenhas. Sep 77, 12p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.

This description of the Africa Bibliographic Centre (ABC) concept--which is still in a formative stage--provides brief summaries of the 12 components of the system, including an African lending library, bibliographic publishing, a commission on information and bibliographic systems, an African microfiche publications center, African abstracting and SDI services, an African media magazine, an African bibliographic database, the use of ultrafiche, and a distribution center of source materials from Africa. Since 1974, the ABC Newsletter has been edited by the ABC Secretariat in Dar es Salaam, which is also involved in testing the feasibility of the ABC Africa Index (the African periodicals index).

ED-176 754 Not available NTIS
Books for Colleges of Education Libraries Project, Karnataka, India. A Cooperative Acquisition Plan,
K. Setty Umapathy. Sep 77, 12p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The proposed 3-year project described in this paper would focus on the improvement of library service in colleges of education in the state of Karnataka through collection building. While staff, service, and budget problems are also cited, this project would emphasize the formulation of standards for collections and the development of a cooperative acquisition program. The first step in this process would be the compilation of a master want list by a committee representing the universities, colleges of education, library educators, and professional associations. The basic list of 10,000 book titles would be reviewed by subject specialists before being submitted to college of education libraries, where librarians, in consultation with faculty and students, would indicate the 5,000 titles they would like to have. Consolidated orders for the titles selected would be prepared by the project center, where items would also be cataloged before being sent to individual libraries. It is recommended that the institutions concerned jointly approach the Ministry of Education for the state and the University Grants Commission of India and request a one time grant to cover the total cost of such a project.

ED-176 755 Not Available NTIS
Cooperation of Libraries to Ensure the Satisfaction of Requirements in Information and Literature by the Broad Masses of People: Development and Experiences in the German Democratic Republic,
Klaus Plotz. Sep 77, 14p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This overview of the situation in library cooperation in the German Democratic Republic with regard to the legal fundamentals for library work emphasizes the role of the head offices of librarianship, which are responsible for the coordination and direction of development. The existing structure and networks (territorial and special) are also reviewed with special attention to the role of the Library Association of the German Democratic Republic. The need for closer cooperation between libraries and centers of information is identified.

ED-176 756 Not available NTIS
Coordinated Economic Development and the Information Network,
D. K. Easton. Sep 77, 9p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This is a discussion of some of the problems that the Advisory Organization for Gulf Industries (AOGI) will face when it undertakes (1) to organize both an information center (node) that will serve the information needs of the Gulf States of Iraq, Kuwait, Bahrain, Saudi Arabia, Qatar, the United Arab Emirates (UAE) and Oman; and (2) to compile an indigenous data bank that can supply the nations of the world with comprehensive economic information and statistics about the seven member states. Emphasis is placed on the collection and indexing of data.

ED-176 758 Not available NTIS
The Development of Library Services in Sri Ianka,
N. Amarasinghe. Sep 77, 7p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report describes the current activities and future priorities of the Ceylon National Library Services Board, which was set up in 1970 for planning and developing library services on a national scale. Among other functions, the board is concerned with establishing the Ceylon National Library, promoting the development of library education and training, and publishing standard works in Sinhala and Tamil.

ED-176 759 Not available NTIS
An Inter-American Network for the Transmission of Bibliographic Information: Plans and Progress,
Marietta Daniels Shepard. Sep 77, 10p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document summarizes the project of the Organization of American States (OAS) General Secretariat to coordinate its activities in the field of library and information services. In Latin America plans have been made based on cooperative activities and services whereby each library can have access to materials held in all libraries, as well as to cataloging information on new materials. Latin American libraries make use of bibliographic data banks in the United States to accomplish their plans; of special interest to the OAS is the availability of data on books in Spanish and Portuguese. To achieve 'Universal Bibliographic Control' more attention must be given to standardizing and centralizing cataloging efforts in Latin America, and OAS technical cooperation is offered to member states in the form of experts experienced in creating and maintaining centralized cataloging services. The conclusion is a survey of the component parts of an Inter-American Network, and of the procedures necessary to achieve these goals.

ED-176 760 Not available NTIS
The Need for Resource Sharing among Libraries in Tanzania,
Felix K. Tawete. Sep 77, 17p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The validity of resource sharing activities among libraries in Tanzania is examined, and the main types of libraries in the country are summarized with emphasis on cooperation between libraries. Some areas that need cooperative activity are identified as selection, ordering, processing, storage, conservation and protection of books, interlibrary loan and staff recruitment, and training. A survey of the steps already taken by some libraries towards cooperation and some of the problems encountered by these libraries in trying to establish cooperative activities are also included.

ED-176 762 Not available NTIS
Resource Sharing in Relation to Library Acquisition: A Case for East Africa,
B. M. Kawesa. Sep 77, 25p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.

This description of resource sharing by the university (i.e., national), libraries of Kenya, Tanzania, and Uganda examines such factors as finance, communication, and dependence on imported literature. In discussing the acquisition of local literature, it is established that the greatest amount of resource sharing is inter-university, while cooperation with other types of libraries is negligible, and varies with the quality and quantity of the collection of each individual library; it is also noted that gifts and exchanges were greater in number than purchases. Constraints identified are attributed primarily to finance. Potential roles for the Library of Congress collecting center based in Nairobi in the acquisition of local literature by East African libraries are suggested.

ED-176 763 Not available NTIS
Resource Sharing in Singapore Libraries,
Quah Swee Lan. Sep 77, 17p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper reviews resource sharing on three levels: (1) Singapore, (2) jointly with Malaysia, and (3) Southeast Asia. Topics covered include staff training, cooperative acquisition, bibliographical projects, the Cooperative Microfilming Program, the Microfilm Clearing House, and the proposed Consortium of National libraries and Documentation Centers for Southeast Asia. Conclusions indicate that Singapore enjoys good cooperation among libraries, and with links and contracts established with Malaysian and ASEAN neighbors, resource sharing will become a matter of course in the area.

LBL-10247 PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Interactive Computer Graphics Displays for Hierarchical Data Structures.
D. F. Cahn, and C. V. Murano. May 80, 13p
CONF-800529-1
Contract W-7405-ENG-48
American Society for Information Service mid-year meeting, Pittsburgh, PA, USA, 15 May 1980.

An interactive computer graphical display program was developed as an aid to user visualization and manipulation of hierarchically structured data systems such as thesauri. In the present configuration, a thesaurus term and its primary and secondary conceptual neighbors are presented to the user in tree graph form on a CRT; the user then designates, via light pen or keyboard, any of the neighbors as the next term of interest and receives a new display centered on this term. By successive

specification of broader, narrower, and related terms, the user can course rapidly through the thesaurus space and refine his search file. At any stage, he deals with a term-centered, conceptually meaningful picture of a localized portion of the thesaurus, and is freed from the artificial difficulties of handling the traditional alphabetized thesaurus. Intentional limitation of the associative range of each display frame, and the use of color, case, and interconnecting vectors to encode relationships among terms, enhance interpretability of the display. Facile movement through the term space, provided by interactive computation, allows the display to remain simple, and is an essential element of the system. 3 figures. (ERA citation 05:023404)

N80-26711/5 PC **A03**/MF **A01**
SRI International Corp., Menlo Park, CA.
Application of the SRI Cloud-Tracking Technique to Rapid-Scan GOES Observations.
Final Report, 5 Jun. 1978 - 30 Jan. 1980.
D. E. Wolf, and R. M. Endlich. Mar 80, 34p
NASA-CR-159989
Contract NAS5-25027

An automatic cloud tracking system was applied to multilayer clouds associated with severe storms. The method was tested using rapid scan observations of Hurricane Eloise obtained by the GOES satellite on 22 September 1975. Cloud tracking was performed using clustering based either on visible or infrared data. The clusters were tracked using two different techniques. The data of 4 km and 8 km resolution of the automatic system yielded comparable in accuracy and coverage to those obtained by NASA analysts using the Atmospheric and Oceanographic Information Processing System.

N80-27211/5 PC **A02**/MF **A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
A Loose But Indulgent Retrieval Strategy for Computers een Sloridge Maar Toegeefijke Zoekstrategie voor Computers.
T. Deheer. Mar 78, 20p
Text in Dutch; English Summary.

A retrieval system design is described in which information records consisting of pieces of natural language are attached to each other, leaving fuzzy semantic traces behind in the form of sets of three letter strings which have been derived from the original texts. The system calculates an 'importance value' for each possible answer to a user query. Queries also may be given in the form of a simple piece of natural language. Answers are communicated to the user, if he so wishes, in descending order of 'importance value' as calculated by the system.

N80-27272/7 PC **A10**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Publications of the Jet Propulsion Laboratory, 1979.
Bibliography Report, Jan. - Dec. 1979.
15 May 80, 207p NASA-CR-163287, JPL-BIBL-39-21
Contract NAS7-100

This bibliography includes 1004 technical reports, released during calendar year 1979, that resulted from scientific and engineering work performed, or managed, by the Jet Propulsion Laboratory. Three classes of publications are included: (1) JPL Publications; (2) articles published in the open literature; and (3) articles from the bimonthly Deep Space Network Progress Report. The publications are indexed by: (1) author, (2) subject, and (3) publication type and number. A descriptive entry appears under the name of each author of each publication; an abstract is included with the entry for the primary (first listed) author. Unless designated otherwise, all publications listed are unclassified.

PB80-195753 PC **A04**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Fine Particle Emissions Information System.
Annual rept. Jan-Dec 79,
J. P. Reider, and R. F. Hegarty. May 80, 67p
EPA-600/7-80-092
Contract EPA-68-02-2641
See also report dated May 79, PB80-100449.

The report is the second annual report on the Fine Particle Emissions Information System (FPEIS), a computerized data base on primary fine particle emissions from stationary sources. The report summarizes new data added to the FPEIS during 1979 and outlines objectives for 1980 including the emergence of the Environmental Assessment Data Systems (EADS). The FPEIS provides a centralized inventory of fine particle measurement information for researchers engaged in fine particle control technology development and in the environmental assessment of energy and industrial processes. The first (1978) annual report on FPEIS reported 120 test sites in the data base. By the end of 1979, 47 new test sites had been added to the data base and the total of sampling runs had increased to over 2800.

PB80-197163 PC **A06**/MF **A01**
Georgia Inst. of Tech., Atlanta. Economic Development Div.
University-Based Programs Serving U. S. Industry: A Descriptive Catalog.
Esther Lee Burks, David M. Bassan, and Gary W. Kelly. Mar 78, 113p NSF/RA-780740

The catalog is an inventory containing description of 414 university-based programs designed to provide industry with the application of new or established scientific knowledge. It is designed to facilitate the exchange of information among organizations with similar activities, to assist in the planning of government policymakers, and to aid industry to locate sources of expertise in the education community. The means of introduction of knowledge range from technical assistance to basic research, and the sources of support encompass wholly federally-supported programs as well as fully industrially-funded efforts. Scientific knowledge broadly comprises engineering, physical, management, and social sciences. The program format covers activity, name, contact person, age of the program, technical specializations, industrial clientele, geographic area services, funding level, type and percent of research, and dissemination methods utilized. Appendices list information sources and definitions of terms used in interviews with program representatives.

PB80-197627 PC **A03**/MF **A01**
Geological Survey, Reston, VA. Water Resources Div.
Computer Program to Define the Maximum Harmonic Mean Record Length.
Water-resources investigations,
Marshall E. Moss. Sep 79, 26p USGS/WRD/WRI-80/025, USGS/WRI-79-103

The computer program HARMEAN defines values of the harmonic mean length of record for various combinations of numbers of records used to define statistical parameters for a regional regression model and numbers of stations that are to be operated over a finite planning horizon. The maximization can be subjected to constraints of three types: (1) Certain records must be used in the regression analysis, (2) certain records must be extended by data collection during the planning horizon, and (3) certain records cannot be extended during the planning horizon. HARMEAN also allows for the establishment of new data-collection sites during the planning horizon.

SAND-80-0977C PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
User Needs: Is a Survey the Answer.
J. L. Gardner. 1980, 79p CONF-800463-1
Contract EY-76-C-04-0789
New Mexico Library Association conference, Roswell, NM, USA, 18 Apr 1980.

Some of the ramifications of user needs, user satisfaction, and the survey as a shaper of library policy are discussed. The presentation is in three parts: philosophical thinking on user needs and satisfaction, a modest tutorial on survey methodology, and a brief review of the Sandia National Laboratory Technical Library's use of surveys for information gathering and decision making. (ERA citation 05:023405)

UCRL-15226 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Formal Analysis Including Value Judgments and Public Risk.
R. L. Keeney. 28 Apr 80, 24p
Contract W-7405-ENG-48

Many government decisions have an impact on physical risks to the public. These decisions include setting of standards and regulations, licensing of various activities and goods, and allocation of financial resources. In all of these cases, one crucial element in the decision making process is that the expenditure of additional finances can reduce public risk (i.e., save lives and reduce injury and morbidity). The issue, which requires value judgements to solve, is to find the correct balance of expenditures and risks. Unfortunately, many of these important decisions are arrived at through informal decision processes. This paper describes an alternative formal procedure to focus explicitly on some of the value judgments necessarily used in these processes. A prototypical case of the Nuclear Regulatory Commission is examined to illustrte the concepts. (ERA citation 05:024186)

5C. Economics

DIB-80-08-500 PC$10.00/MF **A01**
American Embassy, New Delhi (India).
India Market Research Report on Communications Equipment and Systems.
Foreign market survey rept.,
Ram P. Sachdeva. May 80, 93p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in India for communication equipment; to examine growth trends in Indian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-501 PC$10.00/MF **A01**
Tactical Marketing Ltd., London (England).
Survey of the United Kingdom Market for Medical Equipment.
Foreign market survey rept.
14 Apr 80, 164p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Great Britain for medical equipment; to examine growth trends in British end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-502 PC$10.00/MF **A01**
SIRA Inst. Ltd., Chislehurst (England).
United Kingdom Market for Aids for the Handicapped and Disabled.
Foreign market survey rept.
Jun 77, 64p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Great Britain for aids for handicapped persons; to examine growth trends in British end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-503 PC$10.00/MF **A01**
Frith, Kirk and Spinks Ltd., London (England).

Communications Equipment in the Arab Republic of Egypt.
Foreign market survey rept.
May 80, 201p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Egypt for communication equipment; to examine growth trends in Egyptian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-504 PC$10.00/MF **A01**
Batres, Valdes, Wygard y Asociados, S. C., Mexico City.
The Mexican Market for Communications Equipment.
Foreign market survey rept.
May 80, 123p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Mexico for communication equipment; to examine growth trends in Mexican end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-505 PC$10.00/MF **A01**
Batres, Valdes, Wygard y Asociados, S. C., Mexico City.
Survey of the Mexican Market for Food Processing and Packaging Equipment.
Foreign market survey rept.
May 80, 166p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Mexico for food processing equipment; to examine growth trends in Mexican end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-506 PC$10.00/MF **A01**
Wallace (H. L.) y Asociados, Mexico City.
Mexican Market Survey for Commercial Fishing Equipment.
Foreign market survey rept.
May 80, 163p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Mexico for commercial fishing equipment; to examine growth trends in Mexican end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-507 PC$10.00/MF **A01**
Lindsey (Richard P.), Sao Paulo (Brazil).
Metallurgical Equipment (Brazil).
Foreign market survey rept.
May 80, 45p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Brazil for metallurgical equipment; to examine growth trends in Brazilian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-508 PC$10.00/MF **A01**
Peat, Marwick, Mitchell and Co., Tokyo (Japan).
Computers and Related Equipment Market in the Republic of Korea.
Foreign market survey rept.
Sep 79, 121p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Korea for computer equipment; to examine growth trends in Korean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-509 PC$10.00/MF **A01**
Applied Research Corp., Singapore.
Study of Medical Equipment Market in Singapore.
Foreign market survey rept.
May 80, 106p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Singapore for medical equipment; to examine growth trends in Singaporean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-510 PC$10.00/MF **A01**
PA International Management Consultants, Inc., New York.
The Market for Machine Tools and Related Equipment in the Philippines.
Foreign market survey rept.
Mar 79, 112p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in the Philippines for machine tools; to examine growth trends in Philippine end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-511 PC$10.00/MF **A01**
Kearney (A. T.) International, Inc., Tokyo (Japan).
The Japanese Market for Food Processing and Packaging Equipment.
Foreign market survey rept.
31 Mar 80, 244p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Japan for food processing and packaging equipment; to examine growth trends in Japanese end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

DIB-80-08-512 PC$10.00/MF **A01**
Applied Research Corp., Singapore.
Market Survey of Laboratory Equipment in Singapore.
Foreign market survey rept.
May 80, 177p
U.S. sales only for 8 months. Available to foreign addressees in Mar 81.

The market research was undertaken to study the present and potential US share of the market in Singapore for laboratory equipment; to examine growth trends in Singaporean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed were also reviewed.

LA-UR-80-1014 MF **A01**
Los Alamos Scientific Lab., NM.
Residential Solar Home Resale Analysis.
S. A. Noll. 1980, 6p CONF-800604-15
Contract W-7405-ENG-36
American section of the International Solar Energy Society conference, Phoenix, AZ, USA, 2 Jun 1980.
Microfiche copies only.

One of the determinants of the market acceptance of solar technologies in the residential housing sector is the value placed upon the solar property at the time of resale. The resale factor is shown to be an important economic parameter when net benefits of the solar design are considered over a typical ownership cycle rather than the life cycle of the system. Although a study of solar resale in Davis, Ca, indicates that those particular homes have been appreciating in value faster than nonsolar market comparables, no study has been made that would confirm this conclusion for markets in other geograhical locations with supporting tests of statistical significance. The data to undertake such an analysis is available through numerous local sources; however, case by case data collection is prohibitively expensive. A recommended alternative approach is to make use of real estate market data firms who compile large data bases and provide multi-variate statistical analysis packages. (ERA citation 05:023885)

N80-27213/1 PC **A04**/MF **A01**
Stanford Univ., CA. Dept. of Engineering-Economic Systems.
An Inquiry into the Household Economy.
R. D. Samuelson. Oct 79, 68p NASA-CR-163280, SU-22
Contract NASW-3204

The value of the time which people devote to each activity of their lives is compared with the money they spend on the activity. After tax wage rates are used to value an individual's time. The enormous size of the household economy and the fact that for most activities the value of the consumer's time devoted to an activity exceeds the money expenditures on the activity, suggest that there are many opportunuties for productivity improvements in the household economy which have been overlooked in most traditional thinking on productivity.

N80-27215/6 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Engineering-Economic Systems.
The Economic Basis for National Science and Technology Policy.
D. A. Dunn. Oct 79, 39p NASA-CR-163290, SU-23
Contract NASW-3204

National science and technology policy is concerned with societal choices with respect to the rate and directions of technological change and the adoption and use of new technology in society. Such policy choices occur primarily in connection

with management of the creation, dissemination, and use of scientific and technical information. Two categories of policy instruments discussed are market-oriented approaches, and direct public action. Possibilities for increased use of market-oriented approaches that can provide benefits to society in the form of an increased rate of innovation and of more 'appropriate' technology, better suited to the needs of consumers are indicated.

PB80-195365 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Marketing and Purchasing Div.
Small Fresh Fruit and Vegetable Cooperative Operations.
Cooperative information rept.,
Fred E. Hulse, Gilbert W. Biggs, and Roger A. Wissman. Jun 80, 35p CIR-27

Thirty-four small fruit and vegetable cooperatives using different sales methods -- auctions, sales agencies, and their own sales staffs -- varied importantly in number and type of services provided, production and marketing supplies handled, grower payment methods, grower marketing agreements, and financing methods used. Their operating problems and causes for the demise of four cooperative operations are reviewed. A set of guidelines directed to the organization and operation needs of small fruit and vegetable cooperatives is included.

PB80-195373 PC **A04**/MF **A01**
Smithsonian Institution, Washington, DC.
The Role of Science and Technology in the Economic Development of Ghana,
Edward S. Ayensu. 1978, 57p

The history of Ghana's development is divided into the colonial era, the Nkrumah period, and the post Nkrumah period. The role of science and technology in the development of Ghana is explored in each period and recommendations given for the improvement of Ghana's economic performance through the application of science and technology. The overall failure of Ghana's Council for Scientific and Industrial Research to aid Ghana's development is analyzed. For the most part poor administration is considered to blame for Ghana's trouble. However, corruption, fluctuating world markets, and lack of skilled manpower are contributing factors.

PB80-195845 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Impacts on Consumers: Welfare Economics in the Multiproduct Case.
Staff rept.,
Marie Leigh Forbush, Russell Gum, William E. Martin, Dennis Cory, and Reuben N. Weisz. Jan 80, 89p ESCS-NRED-80-2
Prepared in cooperation with Arizona Univ., Tucson. Dept. of Agricultural Economics.

Measurement of net benefits experienced by consumers is a fundamental component in any comprehensive policy impact analysis. Various methods are employed by economists to gauge impacts on consumers. The objective of this research is to test empirically alternate approaches to measurement of consumer welfare. The validity, accuracy and usefulness of each measure is examined. The empirical test evaluates the economic impacts of the reduction in corn yields.

PB80-196496 PC **A08**/MF **A01**
Economic Development Administration, Washington, DC.
Economic Development Administration, 1979 Annual Report.
1979, 154p EDA-80-088

The report highlights accomplishments of the Agency in carrying out more than $1 billion in economic development programs to help create jobs, increase incomes and strengthen and maintain tax bases in those areas bypassed by economic prosperity. The Economic Development Administration was firmly established by the President as the lead Federal agency in economic development, and had broadened and strengthened its programs and delivery systems to meet the economic development challenges of the 1980's. The report details these achievements.

PB80-196728 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
The N. E. D. (National Economics Division) Aggregation Routines.
Staff rept.,
Paul C. Westcott. Jan 80, 32p

In the monthly outlook and situation process in the Department of Agriculture, a wide range of agricultural sector economic indicators are forecast. As part of the National Economics Division's (N.E.D.) involvement in this effort, projections are made for the indices of prices received by farmers, the consumer price indices for food, and the market basket statistics. The NED aggregation routines are the computer algorithms used to forecast these agricultural price indicators. The paper provides a description of the available routines showing the series calculated, the equations used, the data requirements, and the on-line computer documentation.

PB80-196975 PC **A03**/MF **A01**
Texas Univ. at Austin. Dept. of Economics.
Large-City Decline and Innovation Diffusion in the Urban System of the United States.
Research rept.,
Niles Hansen. 1978, 30p EDA-ERD-80-155
Grants EDA-OER-621-G-78-15, EDA-99-7-13444

The paper traces concepts of regional development from the heartland-hinterland model to the hierarchical diffusion model and then discusses the relative decline of the heartland. The recent economic development of the South is then discussed in a framework consisting of spatial innovation diffusion, business organization, quality of life factors, and economic-demographic decentralizations.

PB80-196983 PC **A03**/MF **A01**
Texas Univ. at Austin. Dept. of Economics.
Functional Urban Regions in the United States: Nature and Significance.
Research rept.,
Niles Hansen. Oct 78, 27p EDA-ERD-80-154
Grants EDA-OER-621-G-78-15, EDA-99-7-13444

The paper discusses (1) the development, (2) the strengths and weaknesses, and (3) the uses of Bureau of Economic Analysis (BEA) regions for future regional analysis and research. The paper further uses (BEA) region data to analyze recent regional change patterns.

PB80-197155 PC **A03**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Costs of Compliance in Small and Moderate-Sized Businesses.
Final rept.,
Roland J. Cole, and Paul Sommers. Feb 80, 47p BHARC-320/80/001

The paper considers theoretical reasons for expecting small businesses (less than 50 employees) to have more variable, but on average proportionately higher, costs of compliance with government requirements than moderate-sized businesses (50 or more employees). Tension between not complying (with a low probability of being detected and paying the costs thereof) and complying (with high time and money costs per dollar of revenue), result in varied choices for a sample of small businesses but proportionately high costs for those that comply. Moderate-sized businesses are likely to incur lower costs per dollar of revenue when they do comply because many costs are invariant with respect to firm size. Moderate-sized businesses are also more likely to comply because they are more apt to be caught if they do not comply. Empirical tests of this theory for a Washington State sample of small - and moderate - sized sample of businesses confirm that small businesses report higher mean costs but greater variability across firms than moderate-sized businesses.

PB80-197379 PC **A03**/MF **A01**
Aquidneck Island Development Corp., Newport, RI.
Economic Development Program, Aquidneck Island, Rhode Island.
Final rept. 1 Nov 77-31 Oct 78.
Jul 80, 28p EDA-80-094
Grant EDA-01-6-09732-28
See also report dated Mar 78, PB-277 943.

The Aquidneck Island Corporation has been very successful in bringing about some diversification of industry, since the 80-acre Aquidneck Industrial Park was established and made industry ready. Positive development and industrial locations has brought several industries to the area since the closing of the Newport U.S. Naval Base in 1973.

PB80-197858 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume 3, Number 13, June 30, 1980.
Bi-weekly pub.
30 Jun 80, 45p
See also Volume 3, Number 10, PB80-179013.
Paper copy available from Supt. of Docs.

The following articles are included: A Guide to Development in Saudi Arabia; New Policy on Exports of Hazardous Substances; Poland Proposes Cooperation on Third-Country Projects; Economic Highlights; Business Outlook Abroad; and Worldwide Business Opportunities.

PB80-198138 PC **A04**/MF **A01**
Penjerdel Regional Foundation, Philadelphia, PA.
Mid-Atlantic Area Trade Adjustment Assistance Center, Annual Report, September 15, 1978-September 14, 1979.
Apr 80, 61p EDA-80-093
Grant EDA-99-26-09998-10
Prepared in cooperation with Council for Revitalization of Employment and Industry, Philadelphia, PA.

The Mid-Atlantic TAAC operated with a two-tier organizational structure during the first grant year. The area comprisng the Mid-Atlantic Area TAAC consists of the five southeastern counties of Pennsylvania, States of Delaware, Maryland, Virginia, and West Virginia, The District of Columbia, and the entire state of Pennsylvania. The primary thrust of activity in the Mid-Atlantic Area TAAC was in the area of certification. The Mid-Atlantic TAAC provides assistance to trade-impacted firms.

PB80-198625 PC **A04**/MF **A01**
North Carolina Agricultural and Technical State Univ., Greensboro. Transportation Inst.
The Financing of Multijurisdictional Public Transportation Services.
Research rept.,
Alice E. Kidder. Mar 80, 73p UMTA-NC-11-0008-80-1

The study summarizes the means of providing non-federal support for public transportation in eight cities where more than one political jurisdiction is in the service area of the public transportation system. The cities studied are: Albany, New York; Gary, Indiana (and the Northern Indiana Commuter Transportation District); Miami, Florida; Norfolk, Virginia; Sacramento, California; Seattle, Washington; St. Louis, Missouri; and Washington, D.C. The report shows the extent to which funding sources are earmarked, the basis for cost-allocation formulas, the sources of public subsidies, the trends in operating deficits, and the problems inherent in welding several independent political jurisdictions into one financing arrangement. Solutions varied from consolidating taxing authority into one unit of government (as the case of Dade County) to setting a price and allowing jurisdictions to buy the level of service each wants, (as in the case of Norfolk where costs of service to each jurisdiction are determined after netting out revenues). Other solutions included earmarking of already collected state taxes, of basing relative contributions on relative assessments, and pure legislative fiat in allocation of local shares.

PB80-199219 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume 3, Number 14, July 14, 1980.
Bi-weekly pub.
14 Jul 80, 49p

See also Volume 3, Number 10, PB80-179013.
Paper copy available from Supt. of Docs.

Contents:
WITS links U.S. exporters and foreign buyers;
Quarterly analysis of world manufacturers exports;
Countertrade--an international trade tool;
U.S. Mexican tribes sign trade agreement;
Washington trade briefs;
Economic highlights, Foreign Industrial production report;
Business outlook abroad;
Worldwide business opportunities;
Quarterly index.

PB80-199417 PC **A08**/MF **A01**
Pennsylvania Univ., Philadelphia.
Flexing the Flexible Accelerator: Effects of Unemployment Benefits and Inventory Costs.
Doctoral thesis,
Steven Neil Braun. Jun 80, 155p DLETA-91-42-78-09-1
Contract DL-91-42-78-09

The paper shows how experience-rated unemployment benefits and inventory holding costs affect the translation of sales fluctuations into employment and inventory fluctuations. Changes in these costs influence the parameters of a quadratic cost function similar to the one first proposed by Holt, Modigliani, Muth and Simon. The movements of the resulting linear decision rule coefficients can be interpreted as changes in production smoothing and labor hoarding. This is used to show that high unemployment benefits or low inventory costs reduce employment fluctuation and increase inventory fluctuations.

PB80-199987 PC **A08**/MF **A01**
Stanford Univ., CA. Inst. for Communication Research.
The Role of the Telephone in Economic Development.
Technical rept.,
Andrew Peter Hardy. Jan 80, 153p
Contract AID/ta-C-1472

The study is concerned with the role which telecommunications, and more specifically the telephone, plays in economic development. The study tests whether the telephone contributes to economic development, and how it makes this contribution. Indicators of economic development, the telephone, and mass media were used in a pooled, cross-sectional time-series regression analysis.

PB80-200645 PC **A04**/MF **A01**
Kensington Inst., Washington, DC.
Forming a Bank Loan Syndicate, A Procedures Outline.
Final rept.
Jun 80, 59p EDA-80-095
Grant EDA-99-26-07055

The report describes the general structure of and procedures for a commercial bank load syndicate; and, a procedure for evaluating and presenting a commercial credit. It is primarily intended as an aid for the managements of community oriented and minority banks. The report was written under the assumption that the loan syndicate is an effective, efficient and appropriate vehicle for leveraging bank lending power for community oriented, domestic and international lending purposes. The commercial credit evaluation and presentation procedure outlined is presented as a supplemental aid to the banks' presently established credit policies and procedures.

PB80-808959 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Cybernetics. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 175p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts treat the subjects of economic systems dynamics, and econometric modeling. The mathematical and computer-involved aspects of economic models are discussed from a number of viewpoints. (Contains 107 citations)

5D. History, Law, and Political Science

AD-A085 848/0 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria VA
Arms Procurement Cooperation and a European Defense Policy.
Final rept.,
Robert M. Antis. 10 May 80, 92p
Master's thesis.

The development of a European defense policy need not wait for the formation of a European Union. As the activities of organizations such as NATO and the European Communities become increasingly interrelated, military-economic endeavors such as arms procurement lay the foundation for a European defense policy. Different economic, political, and military factors determine which countries are most important in the formation of a defense policy and which nations would only play a minor role. The US could take several actions which would aid in the formation of a European defense policy. The concept of a defense policy evolving from economic and military cooperation is acceptable under neo-functionalist integration theory. While there are numerous plans for how this policy might develop, the key to the entire issue is in the European Council of the European Communities Heads of State. Any progress made toward a European defense policy through arms procurement cooperation will almost certainly begin with the Council. (Author)

AD-A085 855/5 MF **A01**
Naval Justice School Newport RI
Basic Military Justice Handbook. Revised.
Apr 80, 608p
Supersedes report dated Jul 79, AD-A075 043.
Availability: Microfiche copies only.

This publication is designed to simply explain the rater complex legal principles and procedures inherent in the military justice system in order to assist commanding officers, executive officers, legal officers, and discipline officers in discharging their responsibilities under the Uniform Code of Military Justice. In some cases the explanations of law have been somewhat over-simplified for the purpose of clarity and represent only general rules. There may be some uncommon situations where the general rule does not properly resolve the problem. Accordingly, this publication should not be utilized without supplementary legal research. This Basic Military Justice Handbook is divided into five separate sections as follows: (1) Section One - Evidence, (2) Section Two - Procedure, (3) Section Three - Criminal Law, (4) Section Four - Glossary of Words and Phrases, and (5) Section five - Common Abbreviations Used in Military Justice.

PB80-195126 PC **A22**/MF **A01**
Michigan Univ., Ann Arbor.
Federal Program Implementation of the Partnership for Health Act and the Early Periodic Screening, Diagnosis, and Treatment (EPSDT) Program in Michigan, Pennsylvania, and Alabama. Executive Summary.
Final rept. 1 Jun 74-31 Dec 76,
George D. Greenberg, and Robert C. Luskin. Jun 79, 513p NCHSR-80-47
Grant PHS-HS-01495

Objective: to ascertain why state allocations of federal monies and state administrative structures established to implement federal program requirements differ in their procedures and operations. Scope: Michigan, Pennsylvania, Alabama were selected for their diversity regarding administrative characteristics, demographic aspects, health manpower supply, etc. The research described and examined different choices by states implementing EPSDT, and 314(d) of the Health Act; to see what political, administrative or other forces led to the choices; to explore for EPSDT the rapidity of the implementation out of the choices and the flexibility of the block grant in health department funding patterns. Conclusions on EPSDT: it is not a highly visible program of state government. One of three states was influenced by data system weakness, political weakness of the health dept., and specific features in fiscal and professional strength and cooperative relationships. Funds were often shifted for political advantage or administrative convenience rather than program priority.

SAAS-251 PC **A02**/MF **A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Development of International Law Concerning Nuclear Liability.
G. Iffiaender, and G. Kantner. 1979, 14p
In German.
U.S. Sales Only.

A short overview is given of the most important international conventions relating to civil liability for damage to, or loss of, life of persons or property, caused by nuclear incidents during the operation of stationary and non-stationary nuclear installations or transport of nuclear material. In accord with the international provisions, in the German Democratic Republic too, nuclear operators are exclusively liable for such damage unless it has been caused intentionally by the injury party. (Atomindex citation 11:503160)

5E. Human Factors Engineering

N80-27086/1 PC **A03**/MF **A01**
Technische Universitaet, Brunswick (Germany, F. R.). Sonderforschungsbereich 58.
Heart Rate Variability, Pilot Workload, Task Difficulty, Tracking.
F. V. Schick, and H. Radke. Jul 79, 38p DFVLR-FB-79-33
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-653).
Sponsored by Dfvlr.

The usefulness of measurements of heart rate variations for the assessment of pilot workload was studied in a laboratory experiment. Statistical methods were used to analyze the data. The heart rate variations were studied as a function of standard deviations, sums of absolute differences, and frequencies of reversals of instantaneous heart rate.

N80-27095/2 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F. R.). Inst. fuer Physik der Atmosphaere.
The Influence of the Flight Altitude and the Limitation of the Field of View on the Visibility of Targets on the Ground and the Maximum Visibility Flight Altitude.
H. E. Hoffmann. Sep 79, 44p DFVLR-FB-79-35, ESA-TT-654
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-654).

The visibility of targets on the ground for observers in an aircraft was studied. The maximum flight altitudes at which detection, recognition, or identification of ground targets is still possible were calculated under the assumption that the visibility distance is a logarithmic function of the altitude. The constants of this function were determined experimentally.

PATENT-4 206 970 Not available NTIS
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Chromatically Corrected Virtual Image Visual Display.
Patent,
W. M. Kahlbaum, Jr. Filed 23 Oct 78, patented 10 Jun 80, 4p N80-27185/1, PAT-APPL-953 389
Supersedes PAT-APPL-953 389-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An in-line, three element, large diameter, optical display lens is disclosed which has a front convex-convex element, a central convex-concave element, and a rear convex-convex element. The lens, used in flight simulators, magnifies an image presented on a television monitor and, by causing light rays leaving the lens to be in essentially parallel paths, reduces eye strain of the simulator operator.

PB80-199292 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Equal Apparent Conspicuity Contours with Five-Bar Grating Stimuli.
Final rept.,

Gary T. Yonemura, Edward J. Rinalducci, Robert L. Tibbott, and Linda A. Fogelgren. May 80, 40p NBSIR-79-1925
Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Psychology. Sponsored in part by Department of Energy, Washington, DC. Div. of Building and Community Systems.

The report discusses the results of laboratory studies on equal conspicuity (contrast) contours using as the test stimuli five-bar grating patterns, with the results of other experiments in this series conducted by NBS. Basic groundwork is provided for additional experiments and analysis which will form a practical basis for recommending energy-conserving design illumination levels that conform to real-world office activities.

5F. Humanities

BARC-1013 PC **A03**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Thermoluminescence Dating of Potteries Excavated at Bhagwanpura and Mathura.
K. S. V. Nambi, R. Sasidharan, and S. D. Soman. 1979, 35p
U.S. Sales Only.

Thermoluminescence (TL) dating attempts were made on sherds of freshly excavated potteries from Bhagwanpura and Mathura sites. TL measurements were generally made from the fine grains of the potsherds; attempts were also made to separate the quartz inclusions from some of the potsherds and evaluate the TL. Dose-rate estimations were made from an analysis of natural radioactivity of the samples; TLD estimation of the environmental gamma dose-rate component was also attempted for the Mathura sites. The TL age estimates ranged between 2000 and 5000 years, B.P. for the Bhagwanpura series and between 1400 and 3000 years, B.P. for the Mathura series. Distinctly different trends were seen in the ages of graywares and redwares from Bhagwanpura: with increasing depth at the site, the grayware ages diminished (upto 1.3 depth beyond which they do not occur) while the redware ages remain the same upto 1.3 m depth and increase regularly beyond. In the case of eight Mathura potsherds for which the archaeologists' expected age values were available, a good to fair (+- 2 to +- 19%) agreement with the TL ages could be seen for four sherds. The estimated accuracies of the TL ages range between +- 9 to +- 19% and such a high value stems from the generous allowance made for all possible values of water content in pottery and soil over the archaeological period; if reasonable values for the actual degree of wetness could be provided, the TL ages can be estimated with accuracies of the order of +- 5%. (Atomindex citation 11:502235)

PB80-199037 PC **A25**/MF **A01**
Cleveland Museum of Natural History, OH.
Archaeological Investigations of Prehistoric Occupation in Caesar Creek Lake: Clinton, Greene, and Warren Counties, Ohio.
Archaeological research rept. (Final) 1976-78
David S. Brose, Nancy M. White, Stephanie Belovich, Frederick Chapman, and W. B. Clapham. 1978, 587p CMNH/ARR-78/5/IAS
Contract HCRS-C5555(78)

Five prehistoric archeological sites within the Caesar Creek Lake area, were tested, stripped of overburden, and features excavated. The King Road Site (33 Wa 112) was a seasonal Middle Archaic (5000-2500 B.C.) and early Late Woodland (ca AD 800) collecting gathering station. The Wood 73 Site (33 Wa 92), the Pipeline Site (33 Wa 78) and the Ogiesby-Harris Site (33 Wa 83) were small seasonal collecting/gathering stations occupied during the Late Archaic/Early Woodland transition (1000-100 B.C.) and during the late Woodland/Fort Ancient transition (AD 900-1100). The Bunnell Kame (33 Cn 7) was a egalitarian sociomortuary location for Anderson phase Fort Ancient populations (AD 1000-AD 1600). The tested Haines Site (33 Cn 32), a Middle/Late Archaic occupation with future potential was recommended eligible for the National Register of Historic Places. Test excavations at the Carroll-Oregonia Road Site (33 Wa 87), revealed it was a full hunting camp occupied by a population from the Fort Ancient Taylor Village. Analyses suggest that Caesar Creek Valley was a marginal resource procurement zone for prehistoric populations which occupied the adjacent sections of the Little Miami River Valley. Because of its low population density, the Caesar Creek area played no role in transmission of cultural innovations despite its intermediate position between the Little Miami and the Paint Creek basins.

5G. Linguistics

AD-A085 829/0 PC **A03**/MF **A01**
Speech Communications Research Lab Los Angeles CA
Final Report on Contract Number N00014-76-C-0483,
June E. Shoup, and Dennis H. Klatt. 1 Mar 79, 33p
Contract N00014-76-C-0483

Synthetic 'set' - 'sat' and (G AH G) - (G AA G) continua were constructed by the simultaneous manipulation of vowel duration and the first formant target frequency of the vowel. In a randomized identification test, a high trained phonetician transcribed perceived vowel quality when instructed to ignore irrelevant changes in vowel duration. Results are compared with a group of native English listeners who made phonemic judgments when presented with the same tape. It was found that there were large individual differences in the phonetic labels assigned to particular stimuli, so that cross-subject comparisons are not easily made. However, the one phonetically trained observer did show evidence of criterial shifts when only duration was changed, calling into question the commonly held notion that phonetically trained observers can estimate vowel quality independently of duration. A second study of factors contributing to the perception of a natural voice quality in synthetic computer-generated speech was initiated. An additive harmonic speech synthesizer has been designed and implemented in software in order to carry out an evaluation of the hypotheses concerning the perceptual importance of various factors contributing to naturalness in synthetic speech.

AD-A085 893/6 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
The Semantic Interpretation on Noun-Noun Modification by Computer.
Working paper,
Timothy W. Finin. 6 Jun 79, 43p Rept no. WP-21
Contract N00014-75-C-0612

This paper is a proposal for a Ph.D. thesis concerned with the semantic interpretation of noun-noun modification. The study of this topic is being coordinated with the development of the JETS natural language question answering system. One of the goals of this research is a computer program which will interpret instances of noun-noun modification within the domain of discourse of JETS. Related work on noun-noun modification in the disciplines of Linguistics and Artificial Intelligence is described and contrasted to the proposed research. The basic approach being taken is described and the scope of the work is outlined. (Author)

AD-A085 894/4 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Problem Solving in a Natural Language Environment.
Working paper,
Bradley Alan Goodman. 21 Jul 79, 54p Rept no. WP-22
Contract N00014-75-C-0612

The kinds of requests that can be currently handled by natural language data base systems are constrained mainly to simple queries to retrieve information from the data base. The requests must be completely specified by the user (though certain information can be assumed from past context). This paper is a proposal for a Ph.D. thesis that explores requests of a more complicated nature. The goal is to take vague and complex requests from users and turn them into well-defined problems. Missing information will be filled in through world knowledge or from the current dialog context. The transformation of the request into a well-defined problem and the generation of a plan to solve the problem will be guided by a set of problem solving frames. (Author)

AD-A085 895/1 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Relating Images, Concepts, and Words.
Working paper,
David L. Waltz. 1979, 26p Rept no. WP-23

Examination of verbal descriptions of objects suggests that we use hierarchical structures for shape description; the highest levels of the hierarchy provide a general object framework or breakdown into component parts, and a description of each part by analogy to a well-understood set of shapes called 'prototypes'. Lower levels of the hierarchy provide refinement of the analogies and ways in which shapes deviate from the prototypes. The set of prototypes on which the analogies are based contains many common objects, especially natural objects and the parts of the human body, plus certain shapes with special symmetry properties. It is argued that no single 3-D representation scheme is natural for all members of this set of prototypes, and that since unfamiliar objects are described with respect to the basic set of shapes, these objects will have varying shape representation schemes also. (Author)

AD-A085 896/9 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Generating and Understanding Scene Descriptions.
Working paper,
David L. Waltz. Mar 80, 25p Rept no. WP-24
Contract N00014-75-C-0612

This paper explores design issues for a system which has both vision and language, in particular, a system which addresses both the problem of selecting appropriate words and sentences to describe a particular perceptual event, and the related problem of making appropriate inferences about a natural language description of a perceptual event. It argues that perception is basically a description-building process, and that the understanding of scene descriptions is ultimately based on our ability to first use scene descriptions to drive processes of 'picture-building', and then to drive processes of 'event-simulation' which cause the 'pictures' we build to mimic the dynamics of the world. (Author)

AD-A085 917/3 PC **A09**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Research in Natural Language Understanding.
Annual rept. 1 Sep 78-31 Aug 79,
William A. Woods, R. J. Brachman, R. J. Bobrow, P. R. Cohen, and J. W. Klovstad. 31 Aug 79, 178p Rept no. BBN-4274
Contract N00014-77-C-0378, ARPA Order-3414

This report summarizes work done on BBN's ARPA-sponsored natural language understanding project during its second year (from 9/1/78 to 8/31/79). In it we describe in detail a prototype natural language understanding system oriented toward satisfying the information presentation needs of a commander in a command and control context. The system can be requested in English to produce displays of various sorts; it recognizes indirect as well as direct requests by hypothesizing a plan that the user is trying to carry out. The system is designed to be general in its handling of English syntax, indirect speech acts, and arbitrary conceptual descriptions of displays to be produced. It is built out of several substantial components, each of which is described in a chapter in this report: (1) a general knowledge representation language (KL-ONE); (2) a sophisticated state-of-the-art English parser (RUS) and semantic interpretation mechanism (the PSIKLONE Interface); (3) a pragmatics/discourse component capable of plan recognition and understanding indirect speech acts; (4) an intelligent graphics component with an explicit knowledge base describing various object types, display form (shape) types, and coordinate system transformation information. (Author)

N80-26772/7 PC **A15**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.

Geothermal Direct Heat Use: Market Potential/ Penetration Analysis for Federal Region 9.
W. Powell, and K. Tang. May 80, 337p NASA-CR-163267, JPL-PUB-80-41
Contract NAS7-100

A preliminary study was made of the potential for geothermal direct heat use in Arizona, California, Hawaii, and Nevada (Federal Region 9). An analysis was made of each state to: (1) define the resource, based on the latest available data; (2) assess the potential market growth for geothermal energy; and (3) estimate the market penetration, projected to 2020. Findings of the study include the following: (1) Potentially economical hydrothermal resources exist in all four states of the Region: however, the resource data base is largely incomplete, particularly for low to moderate temperature resources. (2) In terms of beneficial heat, the total hydrothermal resource identified so far for the four states is on the order of 43 Quads, including an estimated 34 Quads of high temperature resources which are suitable for direct as well as electrical applications. (3) In California, Hawaii, and Nevada, the industrial market sector has somewhat greater potential for penetration than the residential/commercial sector. In Arizona, however, the situation is reversed, due to the collocation of two major metropolitan areas (Phoenix and Tucson) with potential geothermal resources.

5H. Man-Machine Relations

AD-A085 985/0 PC **A02**/MF **A01**
California Univ San Diego La Jolla Center for Human Information Processing
Finger Movements in Transcription Typing.
Technical rept. Apr 79-Mar 80,
Donald R. Gentner, Jonathan Grudin, and Eileen Conway. 7 May 80, 17p Rept no. 8001
Contract N00014-79-C-0323, ARPA Order-3767

High speed film and key press latencies of a skilled typist show that finger movements usually overlap in time. The starting time of these movements is highly variable, even when comparing identical sentences. Often movements toward keys were initiated out of the order in which the letters were eventually typed. These results conflict with current models of rapid, well-learned motor movements. (Author)

AD-A086 139/3 PC **A08**/MF **A01**
Essex Corp Alexandria VA
Human Engineering Design Criteria for Modern Control/Display Components and Standard Parts.
Final technical rept.,
David R. Eike, Thomas B. Malone, Stephen A. Fieger, and Jimmie H. Johnson. May 80, 171p DRSMI/RS-CR-80-1
Contract DAAK40-79-C-0144

A study was conducted to identify requirements for modification of MIL-STD-1472B to include human engineering design criteria for modern controls and displays; and to reduce the incidence of requests for waiver of MIL-STD-1472 resulting from unavailability of standard parts. Recommended changes are presented with rationales and references. (Author)

N80-27091/1 PC **A18**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
NASA TLA Workload Analysis Support. Volume 2: Metering and Spacing Studies Validation Data.
J. L. Sundstrom. Jul 80, 402p NASA-CR-3239
Contract NAS1-13741

Four sets of graphic reports--one for each of the metering and spacing scenarios--are presented. The complete data file from which the reports were generated is also given. The data was used to validate the detail task of both the pilot and copilot for four metering and spacing scenarios. The output presents two measures of demand workload and a report showing task length and task interaction.

N80-27093/7 PC **A16**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
NASA TLA Workload Analysis Support. Volume 3: FFD Autopilot Scenario Validation Data.
Final Report.
J. L. Sundstrom. Jul 80, 361p NASA-CR-3240
Contract NAS1-13741

The data used to validate a seven time line analysis of forward flight deck autopilot mode for the pilot and copilot for NASA B737 terminal configured vehicle are presented. Demand workloads are given in two forms: workload histograms and workload summaries (bar graphs). A report showing task length and task interaction is also presented.

5I. Personnel Selection, Training, and Evaluation

AD-A085 828/2 PC **A06**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Plumbing and Environmental Support Specialties AFSCs 552X5/566X1.
Occupational Survey Rept.
May 80, 122p

Plumbing Specialty (AFS 552X5). This career ladder has had a long and relatively stable history as an Air Force Specialty. It originated in 1951 as DAFSC 564X0, a designation which it retained until 31 May 1975. At that time, it was redesignated DAFSC 552X5. There have been no major changes in assigned functions or tasks since the last Occupational Survey Report was published in December 1975. In December 1977, military plumbers were compared to civilian Air Force plumbers in terms of jobs performed and job interest (see AFHRL-TR-77-78). Personnel in the Plumbing career ladder are responsible for installing and repairing pipe systems, plumbing fixtures, and equipment; evaluating and correcting plumbing systems for corrosion and scale; and testing and inspecting plumbing systems. The equipment and fixtures that Air Force plumbers work with include, but are not limited, but are not limited to, iron, steel, plastic, fiber, and copper piping and tubing, water heaters, sinks, toilets, and showers; and pumps, traps, drains, meters, unions, and fittings. Plumbers enter the career ladder by either attending the basic course, 3ABR55235, conducted at Sheppard AFB TX or by directed duty assignment. Approximately 42 percent enter the career ladder through attendance of the basic course, which currently lasts 27 academic days. (Author)

AD-A085 900/9 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 31. Competency Curriculum for Ear, Nose and Throat Assistant.
Final rept.
31 Aug 74, 57p
Contract N00014-69-C-0246
Appendix 31 to AD-A085 675 and AD-A085 676.

For abstract see AD-A085 675.

AD-A085 901/7 PC **A06**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 32-Competency Curricula for Ophthalmic Clinic Assistant and Ophthalmic Technician.
Final rept.
31 Aug 74, 118p
Contract N00014-69-C-0246
Appendix 32 to AD-A085 675 and AD-A085 676.

For abstract see AD-A085 675.

AD-A085 902/5 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 33. Competency Curriculum for Dermatology Assistant.
Final rept.
31 Aug 74, 57p
Contract N00014-69-C-0246
Appendix 33 to AD-A085 675 and AD-A085 676.

For abstract see AD-A085 675.

AD-A085 903/3 PC **A03**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 34. Competency Curriculum for Orthopedic Assistant.
Final rept.
31 Aug 74, 46p
Contract N00014-69-C-0246
Appendix 34 to AD-A085 675 and AD-A085 676. See also Appendix 35, AD-A085 904.

For abstract see AD-A085 675.

AD-A085 904/1 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 35. Competency Curriculum for Urology Assistant.
Final rept.
31 Aug 74, 57p
Contract N00014-69-C-0246
Appendix 35 to AD-A085 675 and AD-A085 676. See also Appendix 36, AD-A085 905.

For abstract see AD-A085 675.

AD-A085 905/8 PC **A10**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 36. Competency Curriculum for Operating Room Assistant and Operating Room Technician.
Final rept.
31 Aug 74, 208p
Contract N00014-69-C-0246
Appendix 36 to AD-A085 675 and AD-A085 676. See also Appendix 37, AD-A086 848.

For abstract see AD-A085 675.

AD-A085 907/4 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 38. Competency Curriculum for Psychiatric Technician.
Final rept.
31 Aug 74, 69p
Contract N00014-69-C-0246
Appendix 38 to AD-A085 675 and AD-A085 676. See also Appendix 39, AD-A085 908.

The study objective consisted of a determination of what the health care personnel in the Navy's Medical Department, Bureau of Medicine and Surgery actually do in their occupations; improving the personnel process (education and training); and building a viable career pathway for all health care personnel. Clearly the first task was to develop a system of job analyses applicable to all system wide health care manpower tasks. A means of postulating simplified occupational clusters covering some 50 currently designated Navy enlisted occupations, 20 Naval Enlisted Classification Codes (NEC's) were computerized. A set of 16 groupings that cover all designated occupations was developed so as to enhance the effectiveness of professionals and sub-professionals alike. (Author)

AD-A085 908/2 PC **A03**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 39. Competency Curriculum for Physical Therapy Assistant.
Final rept.
31 Aug 74, 50p
Contract N00014-69-C-0246
Appendix 39 to AD-A085 675 and AD-A085 676. See also Appendix 40, AD-A085 909.

The study objective consisted of a determination of what the health care personnel in the Navy's Medical Department, Bureau of Medicine and Surgery actually do in their occupations; improving the personnel process (education and training); and building a viable career pathway for all health care personnel. Clearly the first task was to develop a system of job analyses applicable to all system wide health care manpower tasks. A means of postulating simplified occupational clusters covering some 50 currently designated Navy enlisted occupations, 20 Naval Enlisted Classification Codes (NEC's) were computerized. A set of 16 groupings that cover all designated occupations was developed so as to enhance the effectiveness of professionals and sub-professionals alike. (Author)

AD-A085 909/0 PC **A04**/MF **A01**
Technomics Inc Oakton VA

A System Approach to Navy Medical Education and Training. Appendix 40. Competency Curricula for Pharmacy Assistant and Pharmacy Technician.
Final rept.
31 Aug 74, 63p
Contract N00014-69-C-0246
Appendix 40 to AD-A085 675 and AD-A085 676. See also Appendix 41, AD-A085 910.

For abstract see AD-A085 675.

AD-A085 910/8 PC **A05**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 41. Competency Curriculum for Environmental Health Assistant.
Final rept.
31 Aug 74, 100p
Contract N00014-69-C-0246
Appendix 41 to AD-A085 675 and AD-A085 676. See also Appendix 42, AD-A085 911.

For abstract see AD-A085 675.

AD-A085 911/6 PC **A05**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 42. Competency Curricula for Medical/Dental Equipment Repair Assistant and Medical/Dental Equipment Repair Technician.
Final rept.
31 Aug 74, 92p
Contract N00014-69-C-0246
Appendix 42 to AD-A085 675 and AD-A085 676. See also Appendix 43, AD-A085 912.

For abstract see AD-A085 675.

AD-A085 912/4 PC **A03**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 43. Competency Curricula for Hospital Administrative Assistant and Hospital Administrative Technician.
Final rept.
31 Aug 74, 42p
Contract N00014-69-C-0246
Appendix 43 to AD-A085 675 and AD-A085 676. See also Appendix 44, AD-A085 913.

For abstract see AD-A085 913.

AD-A085 913/2 PC **A05**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 44. Competency Curriculum for Dental Assistant.
Final rept.
31 Aug 74, 82p
Contract N00014-69-C-0246
Appendix 44 to AD-A085 675 and AD-A085 676. See also Appendix 45, AD-A085 914.

The study objective consisted of a determination of what the health care personnel in the Navy's Medical Department, Bureau of Medicine and Surgery actually do in their occupations; improving the personnel process (education and training); and building a viable career pathway for all health care personnel. Clearly the first task was to develop a system of job analyses applicable to all system wide health care manpower tasks. A means of postulating simplified occupational clusters covering some 50 currently designated Navy enlisted occupations, 20 Naval Enlisted Classification Codes (NEC's) were computerized. A set of 16 groupings that cover all designated occupations was developed so as to enhance the effectiveness of professionals and sub-professionals alike. (Author)

AD-A085 914/0 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 45. Competency Curricula for Dental Prosthetic Assistant and Dental Prosthetic Technician.
Final rept.
31 Aug 74, 73p
Contract N00014-69-C-0246
Appendix 45 to AD-A085 675 and AD-A085 676.

For abstract see AD-A085 913.

AD-A085 943/9 PC **A08**/MF **A01**
Army Armament Materiel Readiness Command Rock Island IL Program Analysis and Evaluation Directorate
Program Analysis and Evaluation Directorate Activities Summary. Volume I.
Final rept.
Apr 80, 165p Rept no. DRSAR/PE/N-84-VOL-1
See also Volume 2, AD-A085 884.

This report contains two command-level briefings about the development of (a) a method for allocation of personnel cuts and (b) an intensity of operational employment (IOE) baseline study for ARRCOM. (Author)

AD-A085 971/0 PC **A02**/MF **A01**
Human Resources Research Organization Alexandria VA
ADP Training Administration: System for Managing and Reporting on Training.
Final rept. on task 4.
12 Aug 76, 21p Rept no. HUMRRO-RP-ED-76-31
Contract EPA-68-01-3357
Report on Development of an ADP Training Program to Serve the EPA Data Processing Community.

A computer-based information storage and retrieval system is proposed to support the administration and management of MIDSD educational programs. The primary functions of SMART (System for Managing and Reporting on Training) will be to: (1) Generate reports containing information relevant to near-term planning of programs; and (2) Provide data in detail sufficient to facilitate day-to-day operation and management of courses within a program. Access to the SMART files, for both update and retrieval, will be through low-speed terminals; on-line processing will increase the currency of data resident in the system and will permit users at headquarters and remote locations to meet their informational needs with minimal effort and delay.

AD-A085 999/1 PC **A03**/MF **A01**
Litton Mellonics Systems Development Div Springfield VA
Team Training Applications of Voice Processing Technology.
Final technical rept. 1 Aug 79-31 Mar 80,
Beverly A. Popelka, and C. Mazie Knerr. 31 Mar 80, 36p
Contract MDA903-79-C-0209, ARPA Order-3690

Automated speech technology and intelligent computer assisted instruction offer unique solutions to problems of training teams in communication and coordination skills. At this point in the emergence of automated speech technology, scientists have only begun to explore its training uses. The application of automated speech technology entails adaptive training, or intelligent computer assisted instruction techniques in which the computer acts like a human tutor. This report reviews the goals and accomplishments of automated speech processing and its application to training, especially military team training. (Author)

AD-A086 052/8 PC **A03**/MF **A01**
Australian Military Forces Canberra Psychological Research Unit (1)
Bonegilla Development Project.
Final rept.,
S. A. Martyn, B. Brady, and S. Knox. Sep 79, 41p Rept no. RN-10/79

This report is the final in the series dealing with the Bonegilla Development Project. This Project involves relocation of the Army Apprentices School and the Female Recruit Training School to Bonegilla in the Albury-Wodonba area. A working party was established to investigate the sociological impact on the Albury-Wodonga area of the relocation and to identify programmes which could be undertaken by the Department of Defense and the Albury-Wodonga Development Corporation (AWDC) to alleviate difficulties of those staff and students moving into the area. A series of investigations has been completed by both Defence and AWDC and the present report contains a summary of each individual study and additional information of relevance not necessarily elicited in these enquiries. It presents conclusions and recommendations under a series of headings representing the areas of need elicited in the working party's investigation. (Author)

AD-A086 069/2 PC **A03**/MF **A01**
Federal Aviation Administration Washington DC Systems Research and Development Service
A Systems Engineering Evaluation Method for Piloted Aircraft and Other Man-Operated Vehicles and Machines, with Hypothetical Example of a Systems Evaluation.
Final rept.,
Thomas H. Higgins. 15 Aug 78, 49p Rept no. FAA-RD-78-78

A system evaluation method is presented which systematizes and quantifies both PRP pilot rating procedures and ECP engineering calculation procedure measures of system performance on a logarithmic ratio basis of test aircraft configurations compared to a known selected standard aircraft (vehicle) configuration. The logarithmic units 10 log (ECP test/ECP std) and 10 log PRP test/PRP std) used in this system evaluation method are termed 'decivals, dV' as they are 10 times the log base 10 of the ratio of the ECP and PRP values obtained during tests for the test aircraft configuration compared to the chosen standard aircraft configuration. (Author)

AD-A086 085/8 MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Use of Computer Statistical Packages to Generate Quality Control Reports on Training.
Final rept. Oct 78-Sep 79,
David W. Bessemer, and Brian L. Kottas. Jan 80, 70p Rept no. ARI-RP-80-3
Availability: Microfiche copies only.

Obtaining timely and efficient training management information using limited computer resources and commercially available statistical packages may be difficult in practice. TRAMS (Training Monitoring System) uses the Statistical Package for the Social Sciences to provide graphic summaries and statistical analysis of personnel attitudes before, during, or after training, and can also evaluate changes in attitudes over training. TRAMS takes input from cards during batch processing and produces graphic displays very similar to quality control charts. The output allows a rapid detection of deviant samples and systematic changes in attitudes over time. The system is readily adaptable to evaluation of training data other than attitudes, such as test scores, and easily provides ongoing monitoring of training results. (Author)

AD-A086 131/0 PC **A23**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
Human Performance in Continuous Operations: Volume I. Human Performance Guidelines.
Research product rept.,
Arthur I. Siegel, Mark G. Pfeiffer, Felix F. Kopstein, Lawrence B. Wilson, and Halim Ozkaptan. Dec 79, 548p ARI-RP-80-4A
Contract DAHC19-77-C-0054
See also Volume 2, AD-A086 155.

This document provides guidelines to the military commander on expected human performance degradation of continous ground combat. Degradation projections are based on extrapolations from scientific literature and realistic scenarios of continuous operations. The advantages and application of task restructuring, task reallocation, and work rest management concepts in the continuous operations context are presented along with considerations for training, system design, and performance support. Comprehensive tables show anticipated performance degradation for specific duty positions in the mechanized infantry, artillery, armor, and FIST categories. Methods are discussed for minimizing the anticipated degradation. (Author)

AD-A086 155/9 PC **A08**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
Human Performance in Continuous Operations: Volume II. Management Guide.
Technical rept. Jan-Sep 79,
Felix F. Kopstein, Arthur I. Siegel, Lawrence B. Wilson, and Halim Ozkaptan. Dec 79, 172p ARI-RP-80-4B

Contract DAHC19-77-C-0054
Supersedes Rept. nos. ARI-RP-79-8 and ARI-TR-386, AD-A075 454. See also Volume 1, A086 131.

Guidelines are presented for the measurement of human resources relative to maximizing unit effectiveness during continuous operations. Concrete 'ground rules' for personnel management are presented vis-a-vis continuous operations. Steps to take prior to actual combat are given along with methods for controlling performance degradation during continuous operations. Projected soldier effectiveness as a function of battle length and type of unit are presented. (Author)

AD-A086 156/7 PC **A03/MF A01**
Advanced Research Resources Organization Washington DC
Physical Performance Standards for Army Jobs: Criterion Task Manual.
Research product rept. 28 Dec 78-30 Jan 80,
David C. Myers, Deborah L. Gebhardt, and Edwin A. Fleishman. May 80, 46p ARI-RP-80-5A
Contract MDA903-79-C-0093

This manual provides a listing of the tasks of four Army jobs which were rated by incumbents as the most physically demanding and the most critical, on the following dimensions: upper body strength(static, dynamic, explosive), lower body strength (static, dynamic, explosive), trunk strength, stamina, consequences of inadequate performance, delay tolerance, and learning difficulty. The jobs are Infantryman, Combat Engineer, Armor Crewman, and Military Police. Research has indicated acceptable reliability for the rating procedure, and the manual indicates some additional utility outside of the military setting. (Author)

AD-A086 175/7 PC **A06/MF A01**
Georgia Inst of Tech Atlanta
A Study of Learning in the Operations of a Viscous Damped Traversing Unit.
Master's thesis,
Geoffrey Alan Robinson. Jun 78, 105p
Contract DAAG39-77-C-0041

Tracking studies concerned with the performance of a human operator attempting to track a point on a form of visual display have been conducted extensively. Few studies have been concerned with the learning of trackers in a field environment. The objectives of this study were to investigate learning of persons doing a tracking task and to find the measure of performance which most accurately describes learning. the apparatus to be used by the subject trackers and the data collection devices were of exacting manufacture. Experimental error was held to a minimum by careful controls. The results were that learning was noted in all trackers. Learning was accomplished in the first ten trials, after which performance plateaued. Standard deviation of error in the horizontal direction was the best measure of learning. Tracking error was affected by autocorrelation. Three subjects showed no significant difference in their standard deviations of error at the end of the experiment.

AD-A086 198/9 PC **A03/MF A01**
New Mexico Univ Albuquerque Coll of Engineering
Summer Research of Factors Influencing High School Student's Choice of Careers in Defense Related Engineering.
Final rept. 1 Jun 77-30 May 78,
Richard S. Sanchez. May 79, 29p AFOSR-TR-79-0799
Grant AFOSR-76-3090

For a second year in a row, the goal of increasing the supply of minorities, women, and other students in engineering was helped by the UNITE program. This program gave the University of New Mexico College of Engineering an opportunity to work with high school counselors throughout the state of New Mexico and El Paso, Texas to identify high school juniors that express an interest in engineering studies. A large number of counselors and students were also made aware of the opportunities in engineering. The UNITE '77 summer workshop was successful from the viewpoint of the students, program staff, guest lecturers and panelists, and several individuals from Kirtland Air Force Base Weapons Laboratory. The Weapons Lab personnel gave their time to put on their excellent demonstrations, tours, and talks for the participants. The student's knowledge of the world of engineering was definitely increased, and the program staff learned what were the most beneficial activities for conducting an efficient program.

AD-A086 201/1 PC **A03/MF A01**
Center for Naval Analyses Alexandria VA Inst of Naval Studies
Recruiters, Advertising, and Navy Enlistments,
Lawrence Goldberg. Oct 79, 46p Rept no. CRC-409
Contract N00014-76-C-0001

The relation between Navy enlistments by high school graduates in 1971-1977 and the number of recruiters and level of advertising expenditures is analyzed. Allowance is made for changes in economic and demographic factors and Navy goals and policies. A prediction test is made with data from 1978. Both recruiter and advertising are shown to increase enlistments, but there are important differences in their effects. (Author)

AD-A086 202/9 PC **A02/MF A01**
Center for Naval Analyses Alexandria VA Inst of Naval Studies
Rating Assignments to Enhance Retention,
James S. Thomason. Feb 80, 23p Rept no. CRC-426
Contract N00014-76-C-0001

The first-term retention gain from exploiting rating-specified survival probabilities when assigning recruits to ratings is assessed. The reassignment of 28,000 recruits to 37 ratings under the same conditions faced in the original assignment is simulated. A sizeable gain in first-term retention rate is demonstrated. (Author)

AD-A086 258/1 PC **A02/MF A01**
George Washington Univ Washington DC Program in Logistics
Dynamic Student Flow Model: An Overview,
William E. Caves, Dicky Wieland, and W. L. Wilkinson. 12 May 80, 23p Rept no. SERIAL-T-420
Contract N00014-80-C-0169

The Dynamic Student Flow Model is a comprehensive mathematical model which applies network theory and the power of a large scale computer to schedule student naval aviators into and through training in a manner which will achieve maximum pilot production with minimum student pooling. This document provides a broad non-technical description of the model beamed to the executive with little time for details. Potential users with an uncertain interest in the model will find adequate definition herein to justify or dismiss further inquiry. (Author)

ED-176 734 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries: Equity Activity Book.
1978, 44p
For related documents, see IR-007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, MA. 02160 (This item $1.00, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

The activities suggested in this workbook for participants in a continuing education program for in-service school media specialists are designed to develop the trainee's skills in identifying instances of sexism and sex stereotyping in education, and in promoting sex fairness in the library. Exercises and tests on the first module are concerned with assumptions about the sexes and are intended to test the participant's awareness of sex bias in contemporary American society. Focusing on sexism and sex-role stereotyping in school materials, the second module provides material the student may analyze for gender marking and covert sexist messages. Ability to recognize sex-fair materials is tested in the third, while the fourth stresses the recognition of sex-fair resources for school libraries, especially those sources which may be used to counterbalance the reference collection. In the final module, trainees are asked to plan an in-service workshop for teachers, evaluate equity planning suggestions, and evaluate this training program.

ED-176 735 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries: Instructor's Guide,
Karen Beyard Tyler, and Aileen Pace. 1978, 29p
For related documents, see IR-007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, MA. 02160 (This item $0.75, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

This manual for instructors conducting the 'Promoting Educational Equity through School Libraries' continuing education program for inservice school media specialists provides suggestions for classroom discussions, as well as answers to and notes on the questions contained in the workbook. The training program is designed to develop the following: (1) ability to describe sexist assumptions and ways in which they are communicated, (2) ability to identify instances of sexism in instructional materials, (3) ability to identify sex-fair materials, (4) ability to describe inadequacies of existing information collections, (5) ability to build sex-fair collections, (6) ability to promote equity through library practices, (7) ability to promote equity through work with pupils, and (8) ability to promote equity through consulting activities with school personnel. Answers to tests and exercises are keyed to the five training modules: assumptions about male and female, sexism and sex-role stereotyping, sex-fair instructional materials, sex-fair library resources, and educational equity in the library. In addition, four immediate program evaluation strategies are given.

ED-176 736 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries. Introduction and Module 1: Assumptions about 'Male' and 'Female',
Aileen Pace Nilsen, and Karen Beyard Tyler.
1978, 28p
For related documents, see IR 007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, Massachusetts 02160 (This item $0.50, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

Traditional ideas about differences between men and women are examined in this introductory learning module in a continuing education program for inservice school media specialists. The librarian's and media specialist's awareness of how false beliefs regarding sex roles are manifested is intended to provide background useful in the evaluation, selection, and acquisition of library materials that will promote sex fairness in their institutions. Based on the premise that unfair, inaccurate assumptions are unconsciously communicated through society's differing treatments of men and women, as well as through the repetition of images which define these treatments, the material addresses four major areas: (1) differences between males and females which are determined by sex, (2) ideas about maleness and femaleness which are inferred from sex-determined differences, (3) why such ideas are unfair to both sexes, and (4) ways in which such ideas are communicated. Six specific assumptions based on innate sex differences are stated, along with illustrations of how each is expressed through the media, how behavior is shaped to support the assumption, and reasons why the assumption is unfair or untrue. Tests and exercises to accompany this module are included in a separate activity book.

ED-176 737 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries. Module 2: Sexism and Sex-Role Stereotyping in School Materials,
Alleen Pace Nilsen, and Karen Beyard Tyler.
1978, 31p
For related documents, see IR-007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, Massachusetts 02160 (This item $0.75, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

The second learning module in a continuing education program for inservice school media specialists focuses on sex stereotyping and ways in which inaccurate ideas about sex differences are transmitted through instructional materials in exploring the following questions: (1) Why do school materials communicate sexist ideas and sex-role stereotypes. (2) How is the language of school materials sexist. (3) How do illustrations in school materials communicate sexism and sex-role stereotyping, and (4) What evidence of sexism and sex-role stereotyping is found in instructional materials. Six specific examples of false assumptions derived from innate sex differences are listed, along with ways in which those assumptions are communicated in instructional materials and literature. Examples of sexist attitudes as they are covertly perpetuated through grammar and language are given to increase the reader's awareness of the probes in such a way that instructional materials can be evaluated for their degree of sexist content. Tests and exercises on this module are included in the accompanying activity book.

ED-176 738 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries. Module 3: Sex-Fair Instructional Materials,
Alleen Pace Nilsen, and Karen Beyard Tyler.
1978, 8p
For related documents, see IR-007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, Massachusetts 02160 (This item $0.25, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

The sex-fair characteristics which school librarians and media specialists should look for in the content, language, and illustrations when selecting instructional materials are described in this third learning module of an inservice continuing education program. Recommended criteria for selection include the portrayal of approximately equal numbers of males and females as competent participants in the working world and in the home, as people having a wide range of behavioral traits, and as people making significant contributions to civilization. Indications of sex-fair language in school materials are listed as follows: (1) the use of masculine pronouns only when males are referred to, (2) use of neuter generic terms in preference to masculine generic terms, (3) use of neuter occupational titles, and (4) the exclusion of preventable sexist stereotyping. Similarly, sex-fair illustrations are said to be those which depict realistic percentages of males and females, symbolization without stereotyping, awareness of body language, non-sexual grouping, non-sexist sizing and coloration, and clothing appropriate to the task in which people are engaged. Further criteria are presented for identifying material which will counterbalance sexist materials more strongly. Exercises for this module are included in the accompanying activity book.

ED-176 739 Not available NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries. Module 4: Sex-Fair Resources for School Libraries,
Alleen Pace Nilsen, and Karen Beyard Tyler.
1978, 29p
For related documents, see IR 007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, Massachusetts 02160 (This item $0.75, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

The school librarian or media specialist who wishes to promote educational equity through the selection of sex-fair materials is offered guidance in determining the suitability of reference sources in this fourth learning module of a continuing education program. The inadequacies of traditional resources are examined in three categories--omissions of women, sex-role stereotypes, and sexism in language and content. Specifically, general encyclopedias for children and students, biographical reference materials, and reference materials about language are explored for their sexist traits. Discussions on the counterbalancing of the omission of women, of inadequate information about women's roles and rights, and of sexism in language precede a list of 40 sources which will assist library personnel in correcting existing deficiencies in reference materials in the areas of biography, historical background and documents, art and sports, health, statistics, career guidance, rights under the law, and language. Exercises on this module are included in the accompanying activity book.

ED-176 740 Not available at NTIS
Arizona State Univ., Tempe.
Promoting Educational Equity through School Libraries. Module 5: Educational Equity in the Library,
Alleen Pace Nilsen, and Karen Beyard Tyler.
1978, 25p
For related documents, see IR 007 677-683. Sponsored in part by Office of Education, Washington, DC. Women's Educational Equity Act Program.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from EDC/WEEAP Distribution Center, 39 Chapel Street, Newton, Massachusetts 02160 (This item $0.75, complete set of materials $4.75. Checks should be made payable to: Education Development Center).

Suggestions offered in the fifth module of a continuing education program for inservice school media specialists are designed to aid in identifying sexism and sex-role stereotyping in instructional materials, and help trainees foster educational equity in their own institutions. The first part is concerned with the promotion of such equity through building a sex-fair collection, revising discriminatory subject headings and references in the card catalog, encouraging the use of collective biographies, and preparing displays which appeal equally to both sexes. Interaction with students is also discussed, in the context of ways in which librarians can guide the students' reading choices, inform them about women authors, help them understand the usage of the generic term 'man', and direct them in their research activities. Librarians' interactions with teachers are discussed with reguard to developing a professional reference collection of works on sexism in education, promoting the use of sex-fair materials, advancing the use of nonsexist language, and designing workshops for inservice education. Bibliographies list aids to selecting materials to counterbalance and supplement the curriculum materials. An action rating sheet and a workshop evaluation form are included in the accompanying activity book.

ED-176 742 Not available NTIS
Puerto Rico Dept. of Education, Hato Rey.
Readiness for an Effective Dissemination Program.
Final rept. Jul 76-Dec 77.
1978, 64p
Grant NIE-G-76-0047
Test in Spanish and English.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This final report describes a coordinated dissemination program that was developed to help provide educational information to the teaching personnel of the Puerto Rico Department of Education. Objectives, problems, accomplishments, and recommendations are included; appendices provide the program's budget, the questionnaire used to assess the needs for educational information dissemination, tables of minimal competencies in areas of critical underachievement (for fourth and seventh grades of the Barranguitas School District), summaries of Title III validated projects, summaries of documents, and a list of documents collected in the dissemination center.

HRP-0029496/7 PC **A05**/MF **A01**
Center for Human Resources Planning and Development, Inc., East Orange, NJ.
Health Systems Agency Board Training and Continuing Education: A Model to be Implemented by the Centers for Health Planning.
5 Oct 76, 92p

This report proposes that a model training process and continuing education system be devised for use by DHEW's centers for health planning; it also contains a plan for the effective flow of information relevant to the training of health systems agency (HSA) governing boards. The National Health Planning and Resources Development Act (Public Law 93-641) specifies that consumers be involved in health care planning; this is reflected in the model. The model training process encompasses the following dimensions: (1) enables providers and consumers to bring to the planning process expertise resulting from their life and occupational experiences; (2) provides a continuing education program; (3) provides an organizational base for training that does not impede progress; (4) views the content, sequence, and timing of the training schedule as relevant to needs and as flexible; (5) uses an informal, primarily verbal, training technique; (6) provides technical information on health and social issues; (7) provides trainees with substantive knowledge about the health care system; and (8) provides basic instruction in the vocabulary and language of the health care industry. Work program activities associated with the model are detailed, budgetary data on the training process are given, and a time schedule for the implementation of training activities is included. Resumes of staff are appended.

HRP-0029510/5 PC **A03**/MF **A01**
Wayne County Community Coll., Detroit, MI.
An Admission Formula to Admit and Retain the Non-Traditional Student in Nursing,
Della Goodwin, and John Arbuckle. 1977, 31p

The two-stage, computerized admission procedure of the Wayne County Community College of Metropolitan Detroit (Michigan) nursing program for nontraditional students is described. The admission policy has been developed to open the associate program to urban groups formerly excluded and to increase the supply of competent nurses. The typical student is 35 years old, female, and married, has had poor grades, and belongs to a minority group. A student rating form, which records prerequisites, motivation, success potential, and personal data, has been analyzed with stepwise multiple regression analysis to determine success predictors, and validated through further analysis. State board examination scores and a survey of employers are measures of success. The present admission model uses prediction equations based on four predictor variables and five motivation indexes; the results are analyzed by computer and all students are ranked. Prerequisites to the admission process are the course 'Introduction to Health Careers', student development of an individual 2-year plan for requirement completion, and a personal interview; specific curriculum policies enhance students success potential. It is emphasized that student entry criteria can capitalize on the population's whole range of strengths. A bibliography, nine tables, and two figures are supplied.

HRP-0030847/8 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.

The Place of Health Education in Health Administration.
1977, 27p ICP/HED-003
Report on a Working Group, Held at Manchester (England) on March 29-April 1, 1976.

The structure of health education in European countries was addressed by a working group of World Health Organization. The need for including health education activities in all health and other related programs was stressed. This occurred because it was observed that the responsibility for planning, guiding, and coordinating health education activities in a number of European countries rests with a unit of health education at the central health administrative level, that governments are advised on health education matters by a health education council or similar body in other countries, and that health education is carried out by voluntary organizations in some countries. Working group members generally agreed that health education structures are largely governed by sociopolitical structures; health education should be integrated to the health service delivery system; centralization as related to organization, finance, and staffing is advisable; evaluation should be a necessary component of all health education programs; the development of health education can be facilitated by qualified personnel and the establishment of attractive career possibilities; and long-term training for health educators is dependent on the political will to guarantee adequate and continuing resources. Recommendations of the working group to improve health education are enumerated.

HRP-0030848/6 PC **A04**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Training Manpower for Health Administrations.
1976, 56p ICP/HMD-020
Report on the Working Group on Specific Problems of Schools of Public Health, Held at Brussels (Belgium) on September 9-11, 1975.

The task of this working group, convened by the World Health Organization, was to review roles and functions of schools of public health with regard to health administrators. The basis for organizing the working group was recognition of the increasing rate of change in the character and range of public health problems throughout the world and especially in more developed European countries. Four major aspects of the working group's program were to identify manpower needs and problems in public health services, evaluate educational needs of health administrators, assess educational responses to new needs of health services (administrative and organizational, and curricular and technical), and to note joint responsibilities of health administrators and public health education systems (planning, implementing, and evaluating educational programs). It was determined that training manpower for health administrator positions is influenced by demographics and epidemiology, environmental health control, interaction between educational systems and health administrators, the need for all health professionals to have some knowledge about public health, and the need for appropriately organizing educational programs and for training health administrators to communicate effectively with the public and politicians. Illustrations pertinent to manpower development are included.

HRP-0902153/6 PC **A05**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Potential Role of the University Medical Center in Supporting Rural Medical Practice. Development of a Needs Assessment Questionnaire,
Hamilton B. Brown, Max Bennett, Peter DiVasto, and Lynn Rosner. 21 Sep 79, 100p
Contract PHS-HRA-231-77-0039

In 1976, the Bureau of Health Manpower (BHM) and the National Health Service Corps (NHSC) determined that there was a need to develop methods and resources for providing continuing medical education (CME) to NHSC assignees. Three demonstration contracts were awarded by the BHM to academic centers for the creation of special CME resources and systems aimed at reaching Federal providers. As the recipient of one of the contracts, the University of New Mexico (UNM) has, for the past three years, provided educational and clinically related support services to a group of NHSC assignees in New Mexico and Southern Colorado. Services have been organized around the concept of outreach through a university-associated primary care physician with rural experience. Coordination and integration with various other components of the UNM Medical School has provided a multi-dimensional support structure designed to channel medical center resources to rural providers.

HRP-0902154/4 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: A Manual for Providers.
Hamilton B. Brown. 23 Apr 80, 22p
Contract PHS-HRA-231-77-0039
See also HRP-0902160.

This is a brief pamphlet produced by the National Health Service Corps to help you obtain the necessary continuing medical education support so that you can practice the quality of medicine that you want to in your own locality. This pamphlet talks about some of the things you can do as practitioners to better define your own needs for further education. Also, it covers some of the advantages that you have working for the NHSC, which include linkage to a clinical support system in your region that can help solve many of your continuing education problems. In addition, the authors list a number of resources for self-assessment programs and correspondence courses.

HRP-0902155/1 PC **A04**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: A Manual for Program Directors,
Hamilton B. Brown. 23 Apr 80, 56p
Contract PHS-HRA-231-77-0039

The National Health Service Corps is committed to the principle of providing support services to physicians and physician extenders who are working for the Corps. This manual is directed to those who are involved with NHSC in providing some kinds of clinical support services and continuing education to NHSC physicians in the field. The manual is a distillation of the experience learned at the University of New Mexico School of Medicine in the National Health Service Corps/Continuing Medical Education Demonstration Project.

HRP-0902156/9 PC **A03**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: A Manual for Regional Clinical Coordinators,
Hamilton B. Brown. 23 Apr 80, 29p
Contract PHS-HRA-231-77-0039

The purpose of this small pamphlet is to give a Regional Clinical Coordinator, some idea of what a clinical support system for the National Health Service Corps providers should include and to give some ideas on how to create an effective system. The information in this pamphlet is based on the experience of the National Health Service Corps/CME Project at the University of New Mexico which has been funded by the Bureau of Health Manpower to develop clinical support services for the National Health Service Corps in New Mexico and southern Colorado. Because the experience was gained in a rural environment, this pamphlet may be applicable to large urban areas.

HRP-0902157/7 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. School of Medicine.
Conduct and Evaluation of a Continuing Medical Education System for the National Health Service Corps - Contract Summary.
Rept. for 1 Aug 77-30 Sep 79,
Helen C. McCarron, and Louis H. Steinberg. 1 Nov 79, 12p
Contract PHS-231-77-0039

The purpose of this project was to develop educational linkages and continuing medical education programs at a prescribed number of NHSC sites in rural areas in New Mexico and Colorado.

HRP-0902158/5 PC **A04**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: The Comprehensive Report.
Rept. for 29 Jun 76-30 Sep 79,
Hamilton B. Brown. 23 Apr 80, 58p
Contract PHS-HRA-231-77-0039
See also HRP-0902159.

The University of New Mexico National Health Service Corps Continuing Medical Education Demonstration Project was developed to provide a broad spectrum of clinical continuing education resources to rural NHSC physicians and mid-level professionals. During the three year project, the target group expanded to a total of 23 clinics in New Mexico and southern Colorado. At the end of the project, there were 20 physicians and 13 mid-level professionals active in the program.

HRP-0902159/3 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: Executive Summary of the Comprehensive Final Report.
Rept. for 29 Jun 76-30 Sep 79,
Hamilton B. Brown. 23 Apr 80, 7p
Contract PHS-HRA-231-77-0039
See also HRP-0902154.

The University of New Mexico National Health Service Corps Continuing Medical Education Demonstration Project was developed to make a broad spectrum of clinical and continuing education resources more readily available to rural NHSC physicians and mid-level professionals. Initially, the target group comprised 19 physicians and 19 mid-level practitioners assigned to 17 rural clinics located throughout Southern Colorado and Northern New Mexico. During the second year, several sites in Southern Colorado were dropped and all rural NHSC sites in New Mexico were added. At the end, 25 physicians and 17 mid-level practitioners were covered by the project.

HRP-0902160/1 PC **A03**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Family, Community, and Emergency Medicine.
Continuing Medical Education for National Health Service Corps Personnel: The Comprehensive Interim Report.
Rept. for 1 Oct 78-30 Sep 79,
Hamilton B. Brown. 23 Apr 80, 46p
Contract PHS-HRA-231-77-0039
See also HRP-0902158.

The University of New Mexico National Health Service Corps Continuing Medical Education Demonstration Project was developed to provide a broad spectrum of clinical continuing education resources to rural NHSC physicians and mid-level professionals. During the third year, the target group consisted of a total of 18 clinics in New Mexico and southern Colorado. At the end of the project, there were 26 physicians and 17 mid-level professionals active in the program.

HRP-0902220/3 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. School of Dental Medicine.
Faculty Training in Expanded Functions.
Comprehensive rept. (Final),
Lowell W. Smith. 3 Jun 80, 7p
Contract PHS-HRA-232-78-0157

This report should serve to summarize the efforts and accomplishments of the Penn-EFDA Institutes conducted during May, June, July and August, 1979. Two six-week Institutes were held: Periodontics/Local Anesthesia and Restorative/Local Anesthesia for the purpose of training dental auxiliary educators in expanded functions and educational skills in the teaching of expanded functions.

PB80-194350 PC **A18**/MF **A01**
Metropolitan Hospital, Detroit, MI.
A Bibliography of Collective Bargaining in Hospitals and Related Facilities, 1975-1978.
Rept. for 1975-78,

William A. Rothman. 1978, 419p

The report is the fourth volume in a series of bibliographies on health care facility labor relations and collective bargaining. It lists, with appropriate annotations, over 1800 references directly related to labor relations in the health care industry. The work is divided into appropriate listings for: management; bargaining; organizing drives; strikes; legal aspects; appropriate unit determinations; arbitration and mediation; physicians; nurses; technicians; Canada; and an addendum to the previous volume which covered the years 1972-1974. All items are cross-referenced and extensive author and subject index is included.

PB80-196280 PC **A03**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Transcript of Minimum Wage Study Commission Meeting on June 10, 1980.
10 Jun 80, 32p

The report contains the transcript of public hearings and testimony on the effects of raising the rate of overtime compensation and proposed methods of increasing employment.

PB80-196678 PC **A22**/MF **A01**
CSR, Inc., Washington, DC.
Rural Job Creation--A Study of CETA (Comprehensive Employment and Training Act) Linkage with Economic Development.
Final rept.,
A. Lee Bruno, and L. M. Wright, Jr. 29 Feb 80, 505p DLETA-20-51-79-12-1
Contract DL-20-51-79-12

The purpose of the project was to study and provide information on how jobs are created in rural areas through programs under the Comprehensive Employment and Training Act (CETA) joined with local economic develpment ventures. The study report is in two volumes: one presents a literature review and synthesis of case studies geared toward offering practical guidance on how to go about planning and implementing CETA and economic development projects. The second volume presents detailed case studies of 20 selected local sites where the two activities have been successfully linked. Examples include: farming, food processing and sewing cooperatives; furniture and recreation equipment manufacturing; industrial park construction; restoration of historic buildings and conversion of outdated facilities to modern production uses.

PB80-197908 PC **A03**/MF **A01**
Petroleum Conservation Research Association, New Delhi (India).
Operation Diesel Conservation Upgradation of Driving and Maintenance Skills.
1978, 28p

A plan is presented which outlines major alternatives for upgrading the skills of diesel vehicle operators and mechanics in India. The primary objective is to realize savings in fuel consumption.

PB80-198674 PC **A09**/MF **A01**
Arizona Univ., Tucson. Dept. of Political Science.
Maquiladoras and Migration: Workers in the Mexican-United States Border Industrialization Program.
Final rept.,
Mitchell A. Seligson, and Edward J. Williams. 30 Jun 80, 198p DLMA-21-04-78-29-1
Grant DL-21-04-78-29

The study investigates the Mexico-United States Border Industrialization Program (BIP) as a pull factor in internal Mexican migration to the north of the country and in international migration to the United States. Complemented by background research and elite interviews, its major data source consists of a survey of 839 workers in the industry's plants--739 conducted with workers in six Mexican border cities and 100 in two interior cities. It demonstrates that relatively few BIP workers are internal migrants, but that increasing numbers have been drawn to the border by the industry in more recent years. It also provides evidence denying the BIP's role in two-stage migration from the interior to the border and on to the United States. In a comparative analysis, the study also shows that relatively few of the BIP workers have strong propensities to migrate to the United States. The study sets out massive new data on the demographic and socio-economic characteristics of the BIP workforce. Its major policy recommencation centers on the need to expand the interior dimension of the BIP.

PB80-198906 PC **A03**/MF **A01**
Leet and Leet Consultants, New York.
Trickle Up Program Handbook (First Edition),
Glen Leet. c1980, 47p
See also report dated 1980, PB80-198914. Sponsored in part by Agency for International Development, Washington, DC.

There is a substantial body of evidence that when people are encouraged to invest unemployed time in small scale activities-micro projects-they initiate themselves, they can increase their productivity and grow as people in their capacity to solve their own problems. The resulting self-employment will reduce unemployment, and the increased productivity will bring benefits that will 'trickle-up', accelerating national social and economic development. Incentive awards of US $100 each will be made to groups of five or more people who agree to invest 1,000 or more hours of their unemployed time on approved projects they have planned themselves for which they can secure, themselves, all approvals, technical aid, and other resources they need. Priority will be given to projects in which the 1,000 hours of self-employment can be completed within a three-month time period, and in which profits for reinvestment will accrue during that time, not less than 20% of which the group agrees to reinvest as awards for continuation of the project activity, or for other projects they plan.

PB80-198914 PC **A03**/MF **A01**
Leet and Leet Consultants, New York.
The Trickle Up Program in the Caribbean,
Glen Leet, and Mildred Robbins Leet. c1980, 38p
See also report dated 1980, PB80-198906. Sponsored in part by Agency for International Development, Washington, DC.

The study reports on the progress of the trickle-up program in its first one and one half years. Under the trickle-up program incentive awards of US $100 each will be made to groups of five or more people who agree to invest 1,000 or more hours of their unemployed time on approved projects that: (1) they have planned themselves; (2) for which they have or can secure any needed approvals, technical aids, and/or other resources; (3) where the 1,000 hours of self-employment can be completed within three months; (4) where a profit is anticipated; (5) where not less than 20% of the profits will be reinvested for continuation of the project activity, or for other projects planned by the group; (6) where continuing and expanding levels of self-employment are anticipated; and (7) for which reports on activity and results will be provided. The success of the program in the Caribbean make it worth considering for development programs elsewhere.

PB80-200009 PC **A07**/MF **A01**
Applied Management Sciences, Inc., Silver Spring, MD.
Exploratory Evaluation of BEH's (Bureau of Education for the Handicapped) Early Childhood Education Effort.
Final technical rept.,
Sara E. Edmondson, Maureen W. Murphy, J. Michael Cosgrove, Ronald J. Vogel, and Margaret R. Brandis. May 80, 145p G-152.1, OASPE/ETA-79-01
Contract DHEW-100-79-0038

The document represents the final report of an exploratory evaluation of the Early Childhood Education efforts supported through several program divisions within the Bureau of Education for the Handicapped. This preliminary study of the Early Childhood Education Effort addressed the following study questions: (1) What are the expectations and objectives of program managers within BEH; (2) Do those above the Bureau agree with the intended program; (3) Does BEH have measures for its intended program; (4) Is BEH's description of its intended program a sound representation of its program in the field (The findings are based on a small sample of site visits and do not represent the national program as a whole); (5) Are the activities that are in place likely to realize BEH's objectives for the program; (6) How would management use information on program performance. Chapter 2 of this report frames the findings of the exploratory evaluation around the six study questions. Chapter 3 contains a set of management and evaluation options for the Early Childhood Evaluation Effort as a whole and for Individual Bureau programs which serve preschool handicapped children.

5J. Psychology (Individual and Group Behavior)

AD-A085 824/1 PC **A08**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Human Performance: Psychological and Physiological Sex Differences (A Selected Bibliography),
Gerald A. Hudgens, and Linda L. Torsani-Fatkin. Feb 80, 164p

The bibliography is a compilation of 1571 references dealing with, or related to, the effects of sex differences on human performance. The material is organized into four categories: An Overview of Sex Differences, Physiological Sex Differences, Sex Differences in Cognitive and Motor Abilities, and Sex Differences in Personality. The time period covered is roughly from the 1930's into 1979. An index of first authors is included. (Author)

AD-A085 865/4 PC **A04**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
A Device for Tracking the Fundamental Frequency of Speech and its Application in the Assessment of 'Strain' in Pilots and Air Traffic Controllers.
Technical rept.,
J. B. Peckham. May 79, 57p RAE-TR-79056, DRIC-BR-69831

The use of the speech signal for assessing physiological and psychological changes resulting from 'strain' in pilots and air traffic controllers is explained and a device is described for tracking one of the parameters of the speech signal, the fundamental frequency, to quantify changes in this parameter due to 'strain'. (Author)

AD-A085 906/6 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Dichotic Temporal Interactions: Nonmonotonic Discrimination Function,
Harvey Babkoff. 10 Dec 79, 5p
Pub. in Perception and Psychophysics, v27 n3 p273-275 1980.

No abstract available.

AD-A085 993/4 PC **A04**/MF **A01**
Massachusetts Univ Amherst Lab of Psychometric and Evaluative Research
Bayesian Estimation in the One-Parameter Latent Trait Model.
Research rept.,
Hariharan Swaminathan, and Janice A. Gifford. Mar 80, 52p Rept nos. LR-106, RR-80-1
Contract N00014-79-C-0039

When several parameters are to be estimated simultaneously, and when both structural and incidental parameters have to be estimated, a Bayesian solution to the estimation problem may be appropriate. This is the case in latent trait models, where the 'structural' parameters are item parameters, while the 'incidental parameters' are ability parameters since these increase without bound as the numbers of examinees is increased to provide stable estimates of the item parameters. Bayesian estimates for the parameters in the one-parameter latent trait model were obtained for two cases: (1) conditional estimation of ability (for those situations when items are previously calibrated), and (2) joint estimation of item and ability parameters. For each of the two cases, a simulation study was carried out to study the efficacy of the two Bayesian procedures described and to compare the Bayesian estimates with the comparable maximum likelihood estimates.

AD-A085 997/5 PC **A04/MF A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Psychology
Concepts, Propositions, and Schemata: What are the Cognitive Units.
Final technical rept.,
John R. Anderson. 30 May 80, 63p Rept no. TR-80-2
Contract N00014-78-C-0725

Cognitive units are defined within a production system framework. They are sets of elements that are stored in long-term memory in a single encoding act and which are retrieved from long-term memory in a single retrieval. By this definition, concepts in a semantic network are generally considered cognitive units. Various considerations are enumerated for deciding whether propositions and schemata are to be considered cognitive units. These criteria include all-or-none recall, associative priming, and heightened recall. The current state of evidence favors the conclusion that propositions and schemata also be considered cognitive units. It is argued that the necessary and sufficient condition for the formation of cognitive units is that elements in working memory be put in 'correspondences' with elements in long-term memory. A partial matching interpretation of this correspondence process is discussed. (Author)

AD-A086 057/7 PC **A15/MF A01**
North Carolina Univ At Chapel Hill Psychometric Lab
Individual Difference Relations in Psychometric and Experimental Cognitive Tasks.
Final rept.,
John B. Carroll. Apr 80, 334p Rept no. 163
Contract N00014-77-C-0722

A critical survey is made of recent literature pertaining to the possibility of measuring important dimensions of human cognitive ability through various types of simple cognitive tasks. The survey focuses on individual differences (IDs) found in cognitive tasks that have received extensive study in experimental cognitive psychology--for example, simple and choice reaction time, lexical decision, stimulus matching, probed search of short-term memory, memory span, free and serial recall, simple sentence comprehension, and analogical reasoning. Questions of paramount interest were: What kinds of individual differences are observed in these tasks. Do they exhibit sufficient variance and reliability to measure stable individual characteristics that may be of relevance in personnel selection and other operational context. What are the dimensions of these IDs from a factor-analytic standpoint. How are they related to those observed through more conventional psychometric tests. To what extent are they subject to the effects of practice and specific training, or related to demographic variables in such a way as to reduce their utility for operational use. Can the study of individual difference in simple cognitive tasks be valuable in the development of psychological theory. A considerable portion of the monograph is devoted to the definition and specification of 'elementary cognitive tasks' (ECTs) and to how ETCs can be administered, in experimental settings, so as optimally to reveal IDs in cognitive processes. A scheme for classifying ECTs according to basic paradigms is presented, and suggestions are made concerning procedures, including computer simulation, for conceptualizing and analyzing underlying processes.

AD-A086 064/3 PC **A02/MF A01**
Australian Military Forces Canberra Psychological Research Unit (1)
Job Satisfaction.
Technical note,
T. C. Ramsden. Jul 79, 24p Rept no. TN-3/79

Despite the amount of literature on job satisfaction and job performance over the last thirty years, both concepts are still vaguely defined. The dominant theory of job satisfaction until the mid 1960's was Herzberg's two factor theory. The strengths and inadequacies of this theory (and alternatives) with supporting appropriate research evidence are discussed. Variables which have been assumed or found to be related to job satisfaction include pay, position within a hierarchy, social and economic background and job enrichment. The research indicates that the relationship of job satisfaction to other variables is generally neither direct nor simple and is still ill-understood. Job satisfaction and job performance are also found to be neither directly nor simply related. Other factors, such as expectations, pay and knowledge of results intercede to complicate whatever relationship may exist. Research evidence and explanatory models of the job satisfaction/job performance relationship are discussed. Basically, the state of understanding of the nature of the job satisfaction phenomenon and its correlates is poor. (Author)

AD-A086 077/5 PC **A03/MF A01**
Frank J Seiler Research Lab United States Air Force Academy CO
A Review of Research on Written Adjunct Questions: Progress and Prospects.
Interim rept. Apr-Dec 79,
John M. Bermudez, and Mark Nataupsky. Dec 79, 42p Rept no. FJSRL-TR-79-0012

This review is concerned with studies on the intentional and incidental acquisition and retention of written instruction/prose that was modified by questions presented before, within, or following written segments. The work which has been done is integrated and interpreted to suggest new lines for future research. Studies which were included in the review focused on the following variables: text structure and temporal factors, immediate versus delayed criterion testing, effects of motivation on performance, and certain characteristics of learners in relation to instructive written prose. Directions for future research are also discussed. (Author)

AD-A086 174/0 PC **A07/MF A01**
Georgia Inst of Tech Atlanta
Learning Curves and their Applicability to Unit Training Levels in Operational Testing.
Master's thesis,
Jesse Lee Brokenburr. Jun 78, 128p
Contract DAAG39-77-C-0041

This research addresses the problem of determining the existence of a representative group/crew learning curve (or set of curves) and the development of a mathematical description of this curve applicable to training levels in operational testing. Emphasis is placed on the analysis of data from actual operational test reports. An iterative procedure is developed to analyze sample data using regression techniques to screen data for suitability and to fit nonlinear learning models. A representative learning curve for the data analyzed is selected by comparing the sum of squares regression and the lack of fit ratio for each model. This comparison shows that several models appeared to provide an adequate fit to the data analyzed. One of these adequately fits the empirical data analyzed and can be used as a representative group/crew learning model for this data.

AD-A086 176/5 PC **A08/MF A01**
Georgia Inst of Tech Atlanta
Testing for Learning with Small Data Sets.
Master's thesis,
Kenneth Alan Yealy. Jun 78, 160p
Contract DAAG39-77-C-0041

The objective of this research was to develop a simple methodology to test for learning using a small sample size and to develop a procedure for measuring the rate of learning at any particular trial. For this research the time between trials was considered insignificant in affecting previously gained knowledge. Two linear methods and one nonlinear method were developed to test for learning by examining the rate of learning over several trials. In the nonlinear method, estimates for sigma sub epsilon and the parameters 'a' and 'b' are obtained and a test on the degree of nonlinearity of the function is conducted using Beales measure of nonlinearity. If the degree of nonlinearity is small enough then the confidence interval for the slope at any trial can be evaluated by using linear theory approximations. In a comparison of the two procedures, the linear methods were more powerful tests, however, the nonlinear method was able to provide information on the rate of learning at each trial when the nonlinearity conditions were satisfied and significant learning was detected. The more powerful linear test procedure was the LLSR method, which can detect an average rate of learning over 15 trials of .01 at an alpha = .05 level 95% of the time when the standard deviation is sigma sub epsilon < or = .05.

N80-26885/7 PC **A03/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Supporting Statement for Community Study of Human Response to Aircraft Noise.
T. K. Dempsey, R. Deloach, and D. G. Stephens. Mar 80, 30p NASA-TM-81803

A study plan for quantifying the relationship between human annoyance and the noise level of individual aircraft events is studied. The validity of various noise descriptors or noise metrics for quantifying aircraft noise levels are assessed.

N80-27090/3 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Community Reactions to Aircraft Noise in the Vicinity of Airport: A Comparative Study of the Social Surveys Using Interview Method.
Y. Osada. Apr 80, 18p NASA-TM-75439
Contract NASW-3199
Transl. Into English of Koshu Eiseiin Kenkyu Hokoku (Tokyo), V. 20, No. 2, 1971 p 119-127. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A comparative study was performed on the reports of community reactions to aircraft noise. The direct and immediate reactions to aircraft noise such as perceived noisiness, interference with conversations, etc. and various emotional influences were most remarkable; indirect and long term influences such as disturbance of mental work and physical symptoms were less remarkable.

N80-27092/9 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
The Morale Climate of the Crew (From Observations of a Submarine Doctor).
V. Kulikov. Jul 80, 8p NASA-TM-76094
Contract NASW-3199
Transl. Into English from Morsk. Sb. (USSR), No. 7, Jul. 1979 p 35-36. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Personnel interrelationships as affected by sociopsychological compatibility are examined. Practical examples are cited. The principle of complementary temperaments is explored. Stress is laid upon the need for creating conditions that will permit personnel to deal with compatibility problems during the prevoyage preparation period and especially during the confining conditions of a long voyage.

PB80-194293 PC **A03/MF A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Manor Care, Towson Nursing Home on October 18, 1978.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 22 Dec 78, 29p NBS-GCR-80-225
Grant NBS-7-9014

The nursing staff at this nursing home facility were alerted to the occurrence of the fire incident at approximately 1957 hours on October 18, 1978 by an unusual popping noise and an odor of smoke. The odor was localized in the area of the second floor nurses station. The patients were immediately moved from the corridors into their rooms and all the patient room doors on the second floor were closed. Upon investigation the source of the smoke odor was identified as the electrical transformer box for the patient call system. The box was internally heated and warm to the touch. No smoke or flames were visible in the fire incident. Upon identification of the source of the smoke odor, the facility emergency procedures were initiated, the local alarm system was activated, and the fire department was notified. It responded and disconnected the power to the transformer and verified extinguishment. The two story fire resistive building was approximately two years old. The capacity of this nursing home was 115 patients, and the facility had a registered population of 109 patients at the time of the fire incident.

PB80-195605 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Manor Care, Largo Nursing Home on August 14, 1978.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 30 Sep 78, 36p NBS-GCR-80-223
Grant NBS-7-9014

The fire incident at the Manor Care, Largo Nursing Home on August 14, 1978 was detected by the maintenance engineer at approximately 1100 hours. The fire at detection consisted of flaming in the flue of the incinerator with smoke propagation to the incinerator room and the first floor corridor of the east wing. The two story building of fire resistive construction was approximately two years old. At the time of the fire incident the building had a registered occupancy of approximately 100 patients. Forty patients were evacuated by the nursing staff from the second floor skilled care areas, above the area of fire origin, to the second floor solarium. The fire was contained within the incinerator and extinguished by the maintenance engineer with a 5 pound all purpose dry chemical extinguisher immediately prior to fire department arrival. The smoke spread was confined to the first floor east wing area by the smoke barrier doors, with smoke migration to the second floor east wing through minor openings between the first and second floor.

PB80-195621 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Lafayette Square Nursing Center on October 24, 1978.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 28 Feb 79, 30p NBS-GCR-80-226
Grant NBS-7-9014

A staff member observed smoke issuing from the vacant patient room 313 on wing C at approximately 1130 hours on October 24, 1978. The staff member immediately activated the local alarm system and notified the security staff by phone. The security staff initiated the facility fire emergency procedures with the verbal public address system announcement and notified the fire department. The twenty-two patients on wing C had been moved to allow insect extermination operations that morning so wing 3-C was vacant. None of the 262 patients in the facility were evacuated. The fire was of electrical origin and propagated to the interior void space in the partition wall between patient rooms 311 and 313. The fire was extinguished by staff personnel utilizing six 2 1/2 gallon soda and acid extinguishers and two 10 pound carbon dioxide extinguishers. The Baltimore City Fire Department arrived, verified extinguishment and checked for extension of the fire within the wall. The five-story protected ordinary construction and fire resistive construction building was seventy-five years old. The area of fire origin was in the protected ordinary construction section fully protected with automatic sprinklers. The 264 capacity facility had a registerd occupancy of 262 patients at the time of the fire incident.

PB80-195704 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Maryland General Hospital on August 8, 1978.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 31 May 79, 28p NBS-GCR-80-222
Grant NBS-7-9014

The fire incident at the Maryland General Hospital on August 8, 1978 was detected by a nurses aide at approximately 0813 hours. The nurses aide detected an odor of smoke in the west corridor of the sixth floor central nursing unit. The nurses aide immediately reported the condition to the patient care coordinator who went to the corridor and observed a light haze of smoke at the ceiling. The patient care coordinator directed the nurses aide to report the fire incident to the facility telephone operator. The security director was also notified by phone and upon arrival activated the local alarm system. Activation of the local alarm system also automatically transmitted an alarm to the Baltimore City Fire Department through an auxiliary system arrangement. The smoke source was discovered to be a smoldering fire in an ash tray covered with a sheet. Upon staff removal of the sheet and adjacent fuel materials, the fire self-extinguished. The seven story central hospital building of fire resistive construction was approximately thirteen years old. At the time of the fire incident the sixth floor central nursing unit was at full capacity with thirty-eight patients. The Baltimore City Fire Department responded and verified extinguishment.

PB80-195811 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Fire Protection Engineering.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Anne Arundel General Hospital on November 14, 1978.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 22 Dec 78, 30p NBS-GCR-80-228
Contract NBS-7-9014

The fire incident at the Anne Arundel General Hospital on November 14, 1978 was detected by a nursing assistant at approximately 2015 hours. The nursing assistant entered room 412 of 'A' building to prepare the patient for sleeping. The nurses assistant in approaching the patient discovered a charred area completely through the linen one inch in diameter, and a scorched area on the mattress. The eight story building of fire resistive construction was approximately nine years old. At the time of the fire incident the facility had a full patient capacity of 277 patients. The 77 year old male patient was moved from the bed to a chair in room 412. There was no visible fire, smoke, or smoke odor observed by the staff. The fire involving the charring of the bed linen, and the scorching of the mattress appeared to have self extinguished. The facility fire emergency procedures were initiated, and the city of Annapolis Fire Department responded.

PB80-198013 PC **A06**/MF **A01**
Technische Univ., Munich (Germany, F.R.). Inst. fuer Psychologie.
Motivorientierte Aspekte der Verkehrspsychologie (Motivational Aspects of Traffic Psychology),
C. Graf Hoyos, and M. V. Pupka. 1977, 125p
Text in German, abstract in English. Pub. in Unfall- und Sicherheitsforschung Strassenverkehr, heft 7, 1977. Sponsored in part by Bundesanstalt fuer Strassenwesen, Cologne (Germany, F.R.).

The starting point is the question of the significance of the motivation for driving, driving behavior, and driving safety. The authors point out, in particular, that the knowledge of the strength of individual motivation does not permit predictions to be made especially of driving behavior if their functional significance with respect to the personality as a whole is not taken into consideration. Although the literature evaluated in this study does not imply any conclusions with respect to directly applicable measures for the improvement of traffic safety, the authors point out approaches which should be paid attention to in future research preparation and planning in the fields of traffic education as well as traffic information and publicity.

PB80-198468 PC **A17**/MF **A01**
Wildan Associates, Phoenix, AZ.
Mississippi Deltaic Plain Region Ecological Characterization: A Socioeconomic Study. Volume 1: Synthesis Papers,
Douglas K. Larson, Donald W. Davis, Randall A. Detro, Paul B. Dumond, and Edward B. Liebow. Mar 80, 395p FWS/OBS-79/05
Contract DI-14-16-0009-78-095

The Mississippi Deltaic Plain Region extends from Vermilion Bay, Louisiana to the Mississippi-Alabama state line. This study was begun in July 1978 and a full ecological characterization is scheduled for completion in 1981. The overall purpose is to collect, organize and analyze available information from various disciplines (geology, biology, hydrology, socioeconomics, etc.) that will describe each part of the system in terms of its relation to other parts and to the Mississippi Deltaic Plain regional ecosystem as a whole. Socioeconomic characteristics will receive special attention because of extensive oil and gas activities and their impact on the area.

PB80-808652 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Behavior Modification, Disorders and Therapy, 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 214p
Sponsored in part by National Technical Information Service, Springfield, VA.

Reports on behavior disorders, modification and therapy in human subjects are cited in this retrospective collection. Both adult and youth problems are discused, including mental illness, alcoholism, drug abuse, arson, suicide, aggression, law breaking and the special problems of the aged, or physically disabled. (Contains 194 citations)

PB80-813157 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Driver Behavior Under Abnormal Conditions: Physical Impairment, Drugs, and Gases. 1964-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jul 80,
Mary E. Young. Jul 80, 74p
Supersedes NTIS/PS-79/0836 and NTIS/PS-78/0833.

Reports on the performance of motor vehicle operators under unusual conditions are cited. Conditions of stress and fatigue, drug use, physiological effects of exposure to noxious fumes, and physical impairments such as deafness, glaucoma, and heart diseases and their effects on driver performance are included. However, studies on alcohol effects are excluded. (This updated bibliography contains 66 citations, 5 of which are new entries to the previous edition.)

5K. Sociology

AD-A085 834/0 PC **A05**/MF **A01**
Iowa Conservation Commission Des Moines
Recreation Use Projections and Needs Report,
Don Brazelton. 1979, 79p
Contract DACW25-78-C-0010

This report is an assessment of present and projected recreation use in the Great River Environmental Action Team (GREAT II) area, Pools, 11-22. The present and projected use was compared with existing recreation facility supply to rank the pools on the basis of supply and demand for facility development. This analysis, in conjunction with input from recreation resource managers and the public, can be used to develop site specific recommendations for resource management and facility needs.

AD-A085 869/6 PC **A99**/MF **A01**
Naval Justice School Newport RI
Military Justice Procedure Study Guide. Revised.
May 80, 617p
Supersedes report dated May 79, AD-A075 056.

Partial contents: Introduction to the Military Justice System; Preliminary Disciplinary Matters; Nonpunitive Measures; Nonjudicial Punishments; Jurisdictional Limitation as to Persons; Jurisdiction Over the Offense; Convening Courts-Martial and the Accuser Concept; Referral of Charges to a Court-Martial for Trial; The Summary Court-Martial; Constitution of Courts-Martial; Trial by Courts-Martial Generally and the Article 39(a) Session; Pleas and Pretrial Agreements; Military Motion Practice; Voir Dire and Challenges; Instructions, Arguments, Findings and Sentencing; Punishments; Review of Courts-Martial; and Extraordinary Relief and the United States Court of Military Appeals.

AD-A086 122/9 PC **A04**/MF **A01**
Pittsburgh Univ PA Univ Center for Social and Urban Research

Presidentially Directed Relocation: Compliance Attitudes.
Final rept.,
George O. Rogers. May 80, 60p Rept no. UCSUR-80-CD1
Contract DCPA01-77-C-0218

In this report the results of the 1978 national survey are cast in terms of presidential relocation compliance attitudes and their bearing on crisis relocation planning. In this national probability sample, 1620 Americans, 18 years of age and older, were interviewed in the contiguous United States. The responsibility for the fieldwork rests with Marketing Information Service of Atlanta, Georgia. (Author)

AD-A086 244/1 PC **A07**/MF **A01**
Research Triangle Inst Research Triangle Park NC Applied Ecology Dept
Feasibility and Cost Analysis of Surge Period Shelter Programs.
Final rept. Mar 79-Jun 80,
Rajeev V. Kamath, and Milton D. Wright. Jun 80, 143p Rept no. RTI/1798/00-05F
Contract DCPA01-79-C-0233
Includes detachable summary.

Protection of the civilian population from the effects of a nuclear attack is one of the goals of the Federal Emergency Management Agency (FEMA). In-place population protection and protection by relocation are two distinct types of civilian protection plans that are used. The in-place plans demand direct effects protection for the entire risk area population, while in the latter case only a skeleton work force needs to be protected. This report describes the investigation into the feasibility and costs of providing all-effects shelters in risk areas for an in-place shelter plan as well as a population relocation plan.

AD-A086 261/5 PC **A02**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Medicine
The Current Role of Alcohol as a Factor in Civil Aircraft Accidents,
Leonard C. Ryan, and Stanley R. Mohler. May 80, 12p Rept no. FAA-AM-80-4

Ethyl alcohol continues as a serious adverse factor in general aviation flight safety. According to FAA figures, the level of alcohol-associated general aviation fatal accidents has remained relatively static at a 16% general level since 1969. A recent survey of the attitudes of pilots toward alcohol and flying reveals a lack of appreciation among one-third of the pilots concerning the adverse effects of alcohol and safe flight. A renewed pilot education program on alcohol and flight safety appears indicated. (Author)

ALO-80 PC **A02**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
CANVEY: The Reaction of a Community Exposed to Substantial Risks.
L. Cave. Apr 80, 13p UCLA-ENG-7967
Contracts EY-76-C-04-0789, ET-78-S-04-5450

There have been numerous studies which have had as their objective the determination of societal attitudes to risk. The case of the Canvey Island population appears to offer an almost unique opportunity to study the reaction of a large community (some 33,000 persons) exposed to risks from local industries which, as estimated by the regulatory body concerned, are much larger than the average for the rest of the public in the UK. In order to provide further perspective on public reaction to large risks, in conditions where many of the community do not perceive themselves to benefit from the activities which generate the risk, it is worthwhile to record the reaction of the islanders to the situation. (ERA citation 05:024662)

NUREG/CR-1118 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
The Distribution of Illegal Incident Characteristics: Cases of Bank Fraud and Embezzlement, Computer-Related Crime, and Insider Theft from Drug Manufacturers and Distributors.
Jun 80, 124p UCRL-52742
Prepared by Heineke (J. M.) and Associates, Los Gatos, CA.

Three data sets were used to estimate joint and conditional probability distributions between various variables of interest in bank fraud and embezzlement (BF&E) cases of $10,000 dollars or more, computer-related crime cases of various types, and cases of insider theft from drug manufacturers and distributors.

PB80-159940 PC **A06**/MF **A01**
Florida Univ., Gainesville. Alcohol Abuse Prevention Program.
Procedures and Resource Materials for Developing a Campus Alcohol Abuse Prevention Program: A Tested Model,
Gerardo M. Gonzalez. c1978, 120p NIAAA/NCALI-80-01
Sponsored in part by Florida State Dept. of Health and Rehabilitative Services, Tallahassee. Alcoholic Rehabilitation Program.

Methods and materials for implementing a peer-oriented alcohol abuse prevention program on a university or college campus are presented in this manual. Activities to be performed during each of four phases are described in detail, and potential program resources are identified. Recommended procedures are based on those used by the University of Florida in establishing a prevention program which has been successfully adapted on other campuses.

PB80-196660 PC **A06**/MF **A01**
American Alliance for Health, Physical Education, and Recreation, Washington, DC.
A Monograph on Alcohol Education and Alcohol Abuse Prevention Programs at Selected American Colleges.
1978, 114p NIAAA/NCALI-80-02

Evaluation reports on alcohol education and alcohol abuse prevention programs and/or projects from a select group of American colleges (junior colleges, community colleges, and universities) are presented. The reports include: (1) program goals and objectives; (2) organizational structures; (3) needs assessments; (4) program resources; (5) evaluation techniques; (6) training programs; and (7) program development and implementation.

PB80-197494 PC **A99**/MF **A01**
Clemson Univ., SC. Continuing Engineering Education.
IAHS (International Association for Housing Science) International Symposium on Housing Problems, 1976. Volume 1. Proceedings Held at Atlanta, Georgia on May 24-28, 1976,
Parviz F. Rad, Herbert W. Busching, J. Karl Johnson, and Oktay Ural. cMay 76, 873p NSF/RA-761837
Grant NSF-GK-42127
Sponsored in part by Florida International Univ., Miami., Agency for International Development, Washington, DC., and International Association for Housing Science.

The symposium established a forum for the exchange of ideas among policy makers, social scientists, and technologists for development of the interdisciplinary methodology and basic concepts necessary for delivery and management of housing. This conference also developed a dialogue between housing experts and practitioners from various countries so that those from more advanced countries can share their experiences with representatives of other nations in need of such expertise. International experts presented 103 papers during 24 technical sessions on 11 major themes covering a wide array of interdisciplinary topics dealing with virtually all aspects of housing. Specific areas discussed included financing schemes, sociological factors, tenant psychology, housing for senior citizens, building science, mobile homes, delivery-maintenance management, innovative methods and materials, industrialized construction, and energy and climate considerations.

PB80-198096 PC **A15**/MF **A01**
AIA Research Corp., Washington, DC.
Social Benefits and Assessment of Local Urban Open Space: Recommended Program of Environmental Design Research Priorities (Environmental Design Research, Problems and Needs).
Study rept.,
Robin Moore, and Judith Bernstein. 14 Nov 78, 339p NSF/RA-780710
Grant NSF-OPA78-20997
Prepared in cooperation with People-Environment Group (PEG), San Francisco, CA., and Americas Behavioral Research Corp., San Francisco, CA.

The report attempts to identify, justify, and rank environmental research (EDR) problems in the field of local urban open space such as streets, sidewalks, neighborhood parks, play grounds, school yards, shared open space in residential development, institutional grounds, downtown open space, vacant lots, wastelands, and urban wilds. The investigation, oriented towards the interdisciplinary field of people-environment relations, includes contributions from researchers and practitioners across a wide range of disciplines and professions. Based on material gathered from questionnaires, field visits to local community development organizations, telephone and field interviews, and a literature survey, six main areas of research were identified. In top rank, were people-environment management, user satisfactions and values; in second rank, methodology and site types; and in bottom rank, macro-secondary effects. Within each main area, specific topics are identified forming the basis for discussion and recommendation of detailed research program priorities.

PB80-198666 PC **A11**/MF **A01**
National Research Council, Washington, DC. Committee on Evaluation of Employment and Training Programs.
The New CETA: Effect on Public Service Employment Programs.
Final rept. Jun-Jul 79,
William Mirengoff, Lester Rindler, Harry Greenspan, Scott Seablom, and Lois Black. Apr 80, 228p MEL-80-08
Contract DL-23-11-77-05
Supersedes Rept. no. MEL-77/22, PB80-111461.

The report focuses on selected effects of the 1978 Comprehensive Employment and Training Act (CETA) reauthorization amendments, particularly on the Public Service Employment (PSE) programs. Among the basic conclusions are that (1) the new PSE eligibility rules and wage restrictions have successfully increased the share of PSE jobs going to the disadvantaged and have tightened controls against possible abuses, but (2) they also have limited the kinds of PSE jobs and often preclude PSE activities favored and seen as more useful by local governments, and there has been a marked increased in administrative burdens and complexities for the CETA system. The analyses, based on both national data and on field study by local analysts in a sample of 28 CETA sponsors, are essentially of the mid-1979 status of CETA.

PB80-199052 PC **A17**/MF **A01**
Institute for Law and Social Research, Washington, DC.
Decision-Related Research on Technology Utilized by Local Government: Court Scheduling. Volume III: Scheduling Software Description.
Final rept. on Phase 2,
T. F. Lane. Dec 78, 400p NSF/RA-780459
Grant NSF-APR74-20530
See also Volume 1, PB-290 695.

The data support for the scheduling model detailed in this study is an information system to support the model court scheduling system previously established. The resultant Court Scheduling/Mini Process (post-file maintenance system) system provides optimal logic and supporting software which serves as a framework for the coordination and conflict-free scheduling of cases and people. The data support component provides necessary information for calendaring and management. The data base structure must be flexible, easily modified, and still maintain the original design concepts. The main process file maintenance and retrieval capability enables it to be incorporated into the Court Scheduling System with a maximum of flexibility and minimum inconvenience and duplication. Three main implementation options are outlined and samples of interactive tailoring programs are presented. The report includes extensive flow diagrams, implementation instructions, and program listings.

PB80-199094 MF **A01**
Texas Dept. of Community Affairs, Austin.

Recycling Neighborhoods: A Catalog of Housing Rehabilitation Programs and Neighborhood Preservation Activities in Texas. Part I - Program Catalog. First Edition.
Mar 78, 223p
Sponsored in part by Department of Housing and Urban Development, Washington, DC.
Available microfiche only because of poor quality.

The purpose of Recycling Neighborhoods is to show the methods and tecniques Texas communities have chosed to implement the mandate of Congress to encourage the preservation of existing housing and neighborhoods. Those vary from neighborhood to neighborhood and from city to city. The catalog has been designed to be general enough to enable communities to understand the financial approaches utilized by those cities catalogued. This is especially true for communities unfamiliar with rehabilitation programs. Although these financial techniques are presented generally, the method of implementing the various financial programs administratively are more specific to graphically show how the programs are locally carried out. This detail should enable cities with established rehabilitation programs to make variations and refinements based on techniques utilized by other cities included in the catalog. Communities with on-going rehabilitation programs might also make use of the catalog to expand their present neighborhood preservation activities into other types of innovative approaches.

PB80-199169 PC **A02**/MF **A01**
National Community Action Agency Executive Directors Association, Washington, DC.
The Impact of Incarceration on Low-Income Families,
Lennox S. Hinds. May 80, 22p CSA-LN-2559
Grant CSA-30232-D-80-01

The paper describes how the American criminal justice system inflicts special and extraordinary harm on the families of the poor. Too often the families of prisoners disintegrate under the pressures of loneliness, sexual frustration, stigmatization and depleted economics. The author concludes that while a disparate need for broad institutional changes exists, comparatively minor changes in each stage of the criminal justice system could effectively minimize the erosion of the families of the incarcerated.

PB80-199797 PC **A99**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Transcript of Hearings on Condominiums and Cooperatives Held at U. S. Department of the Interior Auditorium, Washington, DC. on February 10, 11, 12, 1975.
Feb 75, 612p HUD/PDR-96, HUD-0001019

Transcripts relate to hearings held in Washington, D.C., February 10-12, 1975, on the issue of condominiums and cooperatives and, particularly, on the problems, abuses, and potential abuses which have been associated with these forms of housing tenure. Pursuant to Section 821 of the HUD Act of 1974, HUD surveyed the numbers and locations of condominiums and cooperative units, studied the nature of the problems, reviewed FHA's Section 234 condominium program, and prepared a draft State condominium statute. The hearings are the final part of the report, which was to be completed by August 22, 1975, and are directed to the Executive and Legislative Branches to assist them in reviewing legislative proposals dealing with condominiums and cooperatives. The statements consider Federal regulations; HUD building standards, technology and codes; market availability; existing projects, their successes and failures; zoning restrictions; and fraud in contracted company workmanship and in substandard materials. Condominium conversion is discussed, as are preferences for building new structures or working with existing buildings. Administration problems, user complaints, and legal fiascos are dealt with. Statements are presented by HUD staff, condominium owners and contractors, attorneys, mortgage company executives, leaders of national associations of cooperatives and condominiums, condominium residents, land developers, and senators.

PB80-204076 PC **A05**/MF **A01**
New York Sea Grant Inst., Albany.
Beach Use and User Constraints in the New York City Coastal Region,
Charles Heatwole, and Niels West. Feb 80, 82p
NYSG-RS-80-01, NOAA-80052714
Prepared in cooperation with Hunter Coll, New York. Dept. of Geology and Geography, and Rhode Island Univ., Kingston. Dept. of Geography and Marine Affairs.

Improvements in mass transportation systems, particularly bus service, could even out the current overuse and underuse of beaches in the New York City coastal region. This survey of users of Coney Island, Orchard Beach, Riis Park, Great Kills, and Jones Beach showed that easy access can encourage people to use a beach they had considered undesirable.

PB80-813058 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Drinking Drivers. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78,
Mary E. Young. Jul 80, 210p

The selected abstracts cover the effects of alcohol on motor vehicle operators, including studies on visual perception, performance tests, alcohol ingestion, safety and criminal justice. (This updated bibliography contains 205 citations, none of which are new entries to the previous edition.)

PB80-813066 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Drinking Drivers. 1979-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jul 80,
Mary E. Young. Jul 80, 178p
Supersedes NTIS/PS-79/0838 and NTIS/PS-78/0607.

The selected abstracts cover the effects of alcohol on motor vehicle operators, including studies on visual perception, performance tests, alcohol ingestion, safety and criminal justice. (This updated bibliography contains 173 citations, 71 of which are new entries to the previous edition.)

PB80-813256 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Quality of Life in the Urban Environment. 1978-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jul 80,
Mary E. Young. Jul 80, 127p
Supersedes NTIS/PS-79/0881 and NTIS/PS-78/0855. See also 1964-July, 1976, NTIS/PS-77/0696 and August, 1976-1977, NTIS/PS-79/0880.

The attitudes of people toward cities and their development and circumstances of living in urban areas are reviewed. In addition to general studies, reports on specific topics such as; transportation, citizen involvement in neighborhood activities, housing, and social services are included. (This updated bibliography contains 119 citations, 34 of which are new entries to the previous edition.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A086 007/2 PC **A02**/MF **A01**
New York Academy of Sciences NY
Interdisciplinary Conference on Carriers and Channels in Biological Systems.
Final rept. 1 Oct 79-30 Jun 80,
Adil E. Shamoo. 24 Jun 80, 5p
Grant N00014-80-G-0023
Prepared in cooperation with Maryland Univ., Baltimore. Dept. of Biological Chemistry.

Cell membranes have a vital and indispensable function for life processes. Membranes endow various cells with their specific function. Therefore, membranes contain highly specific molecules that can function as: carriers, pumps, channels and receptors. These various transport and recognition systems regulate the cell function. Thus membranes, for example, are the site of two most important energy conversion systems in biology - photosynthesis and oxidative-phosphorylation. Photosynthesis represents light conversion into chemical bond energy and oxidative-phosphorylation represents nutrient energy conversion into chemical bond energy. Thus in the past decades investigators have been pursuing to understand the nature of membrane carriers, channels, gates and receptors. The overall objective of this conference was to assist in defining and search for new ways into the problems associated with the elucidation of the molecular basis of passive and active ion translocation across cellular membranes. The conference helped focus the attention into the importance of isolating transport protein carriers and channels from membranous systems. Furthermore, the conference brought to the attention of the scientific audience at the meeting and at large (through the publication of the proceedings) the numerous reconstitution procedures recently developed to study more accurately functional aspects of individual proteins. (Author)

AD-A086 125/2 PC **A02**/MF **A01**
Northeastern Univ Boston MA Dept of Medicinal Chemistry and Pharmacology
Studies on Rheomelanins. VI. The Apparent Lipofuscin Characteristics of Rheomelanins,
Zoltan L. Hegedus, Simon H. Kuttab, and Mark D. Altschule. May 80, 15p
Contract N00014-78-C-0766

The positive histochemical tests obtained on rheomelanins indicate a relationship with tissue lipofuscins, which are also melanins in part. In addition chemical analysis indicates that the rheomelanins contain protein and lipid just as lipofuscins do. Fluorescence exhibited by the rheomelanins also seems to ally them to the lipofuscins. (Author)

AD-A086 135/1 PC **A03**/MF **A01**
Texas Univ Health Science Center At Dallas
Kallikrein and Renin in the Membrane Fractions of the Rat Kidney.
Technical rept. 15 May 79-15 Aug 80,
Kazutaka Nishimura, Patrick E. Ward, and Ervin G. Erdos. 23 May 80, 39p Rept no. TR-20
Contract N00014-75-C-0807, Grant PHS-HL-20594
Sponsored in part by Grants PHS-HL-14187 and PHS-HL-16320.

Plasma membrane (PM) and endoplasmic reticulum (ER) enriched fractions were isolated from the homogenized rat kidney. Transmission electron micrographs of PM showed empty vesicles but no granules present in the fraction. Kallikrein activity was detected in the homogenate, in the microsomal and in the PM and ER fractions; it was most enriched in PM fraction. PM-kallikrein released a kinin, cleaved the peptide substrate, S-2266 and a radio-labeled arginine ester. The ester was also hydrolyzed by renal enzymes other than kallikrein. PM-kallikrein was activated by Triton X-100, phospholipase A(2) lysolecithin, and by a peptide, melittin. Melittin (2 microns) was most potent. It increased the activity to 750%. Solubilized PM and ER kallikrein were inhibited by antibody to rat urinary kallikrein, but membrane-bound kallikrein was more resistant to inhibition. The Km of S-2266 was higher with renal than with urinary kallikrein. PM and ER fractions also contained renin. Its activity was enhanced thirty-fold or more by activators of kallikrein, e.g. by phospholipase A(2), lysolecithin and melittin. Low sodium diet increased the activity of kallikrein in the homogenate and in the membrane fraction. This diet increased the activity of renin in the homogenate but not in the membrane fraction.

AD-A086 136/9 PC **A03**/MF **A01**
Texas Univ Health Science Center At Dallas
Activation of Membrane-Bound Kallikrein and Renin in the Kidney.
Technical rept. 15 May 79-15 Aug 80,
Kazutaka Nishimura, F. Alhenc-Gelas, A. White, and E. G. Erdos. 23 May 80, 26p Rept no. TR-22
Contract N00014-75-C-0807, Grant PHS-HL-20594
Sponsored in part by Grants PHS-HL-16320 and PHS-HL-14187.

Rat kidney contains membrane-bound renin and kallikrein. Kallikrein activity was measured with a spectrophotometric assay and renin by radioim-

munoassay. Plasma membrane-bound kallikrein was activated by lysolecithin and also by melittin, which was a more potent activator. This activation by melittin was independent of calcium concentration. Melittin was, however, a more potent activator of bound-renin in the presence of calcium. Administration of aldosterone to rats for six days increased kallikrein activity in the renal homogenate and in the membrane-enriched fractions, while renin activity was not affected. It was proposed that kallikrein may be located also on the basal membrane of tubular epithelial cells, where aldosterone can enhance its activity. (Author)

AD-A086 137/7 PC **A02**/MF **A01**
Texas Univ Health Science Center At Dallas
Carboxypeptidase-Type Kininase of Human Kidney and Urine.
Technical rept. 15 May 79-15 Aug 80,
D. M. Marinkovic, P. E. Ward, E. G. Erdos, and I. H. Mills. 23 May 80, 25p Rept no. TR-24
Contract N00014-75-C-0807, Grant PHS-HL-20494
Sponsored in part by Grants PHS-HL-14187 and PHS-HL-16320.

A carboxypeptidase was partially from purified human urine and a similar or identical enzyme was extracted from a particulate fraction of the kidney. The enzyme cleaved basic C-terminal amino acids of peptides including bradykinin. The inhibition of the human renal/urinary carboxypeptidase was different from that of plasma carboxypeptidase N (kininase I) or pancreatic carboxypeptidase B. The urinary enzyme was not affected by inhibitors of catheptic enzymes or kininase II and has no carboxypeptidase A activity. The urinary/renal carboxypeptidase had a mol wt of 40,000. The urinary carboxypeptidase did not cross-react with antiserum to human pancreatic carboxypeptidase B. These properties distinguish carboxypeptidase of human urine and kidney from plasma carboxypeptidase N and from pancreatic carboxypeptidase B. (Author)

AD-A086 164/1 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Dept of Human Genetics
The Effects of Erythrocyte Intermediates on Oxygen Dissociation Properties of Hemoglobin.
Final rept. Mar 69-Dec 74,
George J. Brewer. May 79, 39p
Contract DADA17-69-C-9103

The biochemical mechanisms by which the erythrocyte elevates its 2,3-diphosphoglycerate and decreases its oxygen affinity were studied. It appears that a complex set of mechanisms involving the rate limiting enzymes of glycolysis, hexokinase, phosphofructokinase, and pyruvate kinase, are involved. Secondly, an approach to preadaptation to altitude was attempted using pharmacological means. Orally administered phosphate was used in a double-blind study involving 20 subjects taken to Pikes Peak (altitude 4300 m). While differences were not large, the phosphate-treated group had better overall performance in a number of areas compared to the placebo group. Some differences reach statistical significance. These results suggest that a drug with greater effect on reducing oxygen affinity than phosphate might have very salutary effects in altitude preadaptation. (Author)

CONF-7910150-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
New Developments in on-Line Isoenzyme Monitoring for Use in Clinical Diagnostics.
W. D. Bostick, M. S. Denton, and S. R. Dinsmore. 1979, 43p
Contract W-7405-ENG-26
International liquid chromatography symposium II: biological and biomedical applications, Boston, MA, USA, 11 Oct 1979.

Recently, a system for the selective, continuously referenced on-line photometric monitoring of isoenzymes separated by anion-exchange chromatography was introduced. The effluent from the column is mixed with reagent and passes through a delay coil, in which reaction product accumulates. Prior to passage through the spectrophotometer, the effluent stream is split; half is directed to the reference cell of the spectrophotometer and half to the sample cell. An enzymatic microreactor containing immobilized indicator enzymes linking the accumulated reaction product with the generation of a photometrically detectable product is placed in the sample stream prior to the sample cell. The response of the spectrophotometer is highly selective and nonspecific light absorption is effectively blanked. This system has been used for the determination of the isoenzymes of creatine kinase (CK) and lactate dehydrogenase (LD); both of these enzymes are diagnostic of heart damage. The indicator enzymes immobilized onto the microreactor were hexokinase (HK) and glucose-6-phosphate dehydrogenase (GPDH) for CK determination and diaphorase for LD determination. Additional systems for the selective, on-line detection of isoenzymes in chromatographic column effluents are presented. The CK reaction product, ATP, may be monitored by the overall firefly bioluminescence reaction. The use of a flow-through electrochemical cell substituted for an enzymatic microreactor in the continuously referenced detection of LD isoenzymes was investigated.Half of the effluent stream, containing NADH reaction product, passes through a reticulated vitreous carbon electrode, poised at +0.75 to +0.95 V, while half passes through a matched-flow dummy side with no applied potential. A reproducible portion of the NADH in the active side is reoxidized to NAD, thus producing a difference in optical signal between the sample and reference cells of a spectrophotometer monitoring 340 nm. (ERA citation 05:023013)

CONF-791059-4 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of Water-Soluble Conjugates Produced by Hamster Embryo Cells Exposed to Polynuclear Aromatic Hydrocarbons.
M. C. MacLeod, C. J. Moore, and J. K. Selkirk. 1979, 26p
Contract W-7405-ENG-26
International symposium on polynuclear aromatic hydrocarbons, Columbus, OH, USA, 2 Oct 1979.

Evidence is presented which suggests that a major metabolite of B(a)P formed by HEC cultures, AIII, is a glutathione conjugate. It is presumed that metabolite AIII derives from an epoxide intermediate and has been acid dehydrated during preparation. Because of the loss of the hydroxyl function, the original site of epoxidation has not been identified. If AIII derives from B(a)P-2,3-oxide, it would account for the fact that HEC microsomes make reasonably large amounts of 3-OH-B(a)P but only small amounts of 3-OH-B(a)P have been detected in fractions of intact cell incubations. The methodology presented here should be useful in preparing large amounts of AIII for more rigorous structural analysis. The general distribution of PAH in a typical 24 hr incubation of B(a)P with HEC is given. Glucuronide conjugates, organic solvent-soluble metabolites, and the putative GSH conjugate are formed in approximately equal proportions and together constitute over 75% of the total metabolic products. Clearly an incomplete and probably inaccurate picture of the overall metabolic pattern will result if any of these fractions are ignored. Given the apparent selectivity of the conjugation pathways for specific metabolites, the demonstrated time dependency and the system to system variation, it becomes especially important to construct a complete description of the metabolism at more than one time point in the process. Only in this way can metabolism be related to biological endpoints in a meaningful way. (ERA citation 05:023141)

CONF-791059-6 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Reproductive Survival and Macromolecular Synthesis in Cultured Mammalian Cells Exposed to Single Metabolites and Mixtures of Metabolites of Benzo(A)Pyrene.
G. D. Griffin, C. S. Dudney, P. S. Furcinitti, T. D. Jones, and P. J. Walsh. 1979, 27p
Contract W-7405-ENG-26
International symposium on polynuclear aromatic hydrocarbons, Columbus, OH, USA, 2 Oct 1979.

Chinese hamster V79 cells have been exposed to single metabolites and mixtures of metabolites of benzo(a)pyrene (B(a)P) and reproductive cell survival and certain aspects of cellular metabolism were measured. B(a)P trans-7,8-dihydrodiol plus B(a)P 1,6-quinone resulted in increased cell survival compared to treatment with either metabolite alone, the mixture thus producing a neutralizing effect. If B(a)P 4,5-oxide is mixed with 3-HOB(a)P, increasing amounts of 3-HOB(a)P do not cause any additional cell toxicity. When replicate cultures of V79 cells were exposed to either B(a)P 4,5-oxide or 6-HOB(a)P for 4, 12, or 48 h, there was an exposure-time-dependent delay in cell division, the effect being most pronounced for 48 h exposure to 6-HOB(a)P. After the division delay, cells resumed an apparently normal exponential growth rate. A larger percentage of metabolite-treated cells were cycling after treatment, than was the case with control cells, even though the exponential growth rate was similar in both sets. RNA synthesis increased above control levels after removal of the metabolite, particularly in the case of 6-HOB(a)P. Protein synthesis was inhibited by 6-HOB(a)P addition, and after metabolite removal, increased to control levels concomitantly with RNA synthesis. The results suggest that metabolite treatment causes at least a temporary cell-cycle delay. After the metabolite is removed, protein synthesis mechanisms rebound to increase protein synthesis. (ERA citation 05:024762)

DOE/EV/03221-63 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Favism Inducing Agents: A Pulse Radiolysis Study of Isouramil and Convicine.
M. Chevion, and Y. A. Ilan. 1980, 16p
Contract AC02-76EV03221

Isouramil and covicine, substances implicated in precipitating favic crises in glucose-6-phosphate dehydrogenase deficient individuals, have been studied in N sub 2 O-saturated aqueous solutions by pulse radiolysis, and the kinetics of the reactions of both substances with OH radicals were determined. The products of these reactions are addition intermediates absorbing above 330 nm. The decay of the intermediate(s) formed in the isouramil reaction is a biphasic one, while the decay of the corresponding intermediate for the convicine reaction is characterized by a single constant. By analogy to uracil, it is suggested that the OH radical is added to the double bond at either positions 5 or 6 of the pyrimidine ring forming two different intermediates. Each of these intermediates loses a molecule of water indicated by the observed biphasic decay reaction. For convicine on the other hand, position 5 is blocked by the O-gucosidic bond and the addition of the OH radical could take place only at position 6. Thus, a single intermediate is formed and its decay is a single-phase one. It has been shown that although free radicals could not be detected in the course of the reactions between isouramil and oxygen or with cellular components by electron paramagnetic resonance, isouramil can participate in a uni-electron transfer reacton and can form relatively stable intermediates. Thus, it is speculated that in the red blood cells isouramil could give rise to deleterious free radicals. (ERA citation 05:024735)

IRI-133-78-09 PC **A02**/MF **A01**
Interuniversitair Reactor Inst., Delft (Netherlands).
Determination of Trace Elements in IAEA Milk Powder A-11, IAEA Animal Muscle H-4, and IAEA Pig Kidney H-7 by Means of Neutron Activation Analysis.
Th. G. Aalbers, T. G. Verburg, P. S. Tjioe, and J. J. M. de Goeij. Jul 78, 11p
U.S. Sales Only.

Three biological materials serve as reference materials for analytical quality control in various IAEA/WHO coordinated research programmes on trace elements in biological systems. (Atomindex citation 11:501668)

IRI-133-78-11 PC **A02**/MF **A01**
Interuniversitair Reactor Inst., Delft (Netherlands).
Determination of Selenium in BCR Single Cell Protein Via Destructive Neutron Activation Analysis.
J. J. M. de Goeij, and C. Zegers. Oct 78, 13p
U.S. Sales Only.

The amount of selenium in single cell protein (SCP), a product of BP Research Centre at Sunbury-at-Thames, England, was determined by neutron activation analysis. The SCP-samples were irradiated in the reactor of the Interuniversity Reactor Institute at Delft, in a neutron flux of 1.0 x 10 exp 13 n/cm exp 2 s for 24 hours. After chemical destruction of the samples the amount of selenium

was determined by measuring the gamma -peaks of selenium-75. (Atomindex citation 11:501689)

IRI-133-78-13 PC **A02**/MF **A01**
Interuniversitair Reactor Inst., Delft (Netherlands).
Determination of Trace Elements in BCR Single Cell Protein Via Destructive Neutron Activation Analyses.
P. S. Tjioe, J. J. M. de Goeij, J. L. Nooijen, and J. J. Kroon. Oct 78, 9p
U.S. Sales Only.

The amount of some trace elements in single cell protein (SCP), a product of BP Research Centre at Sunbury-at-Thames, England, was determined by neutron activation analysis. The SCP-samples were irradiated in the reactor of the Interuniversity Reactor Institute at Delft in a neutron flux of 1.0x10 exp 13 n/cm exp 2 s for 12 hours. Samples of Bowen's Kale were used as reference material. After a decay of two or three days the samples were chemically destroyed, and the trace elements were separated. The quantity of the following elements was determined by measuring the gamma -activity by means of a scintillation counter: antimony, cadmium, mercury, arsenic and selenium. The amounts of these elements in the SCP and in the reference material were tabulated. (Atomindex citation 11:501735)

IRI-133-79-02 PC **A03**/MF **A01**
Interuniversitair Reactor Inst., Delft (Netherlands).
Routine Chromium Determination in Biological Materials; Application to Various Reference Materials and Standard Reference Materials.
P. S. Tjioe, J. J. M. de Goeij, and K. J. Volkers. 1979, 33p
U.S. Sales Only.

The determination limit under standard working conditions of chromium in biological materials is discussed. Neutron activation analysis and atomic spectrometry have been described for some analytical experiences with NBS SRM 1577 reference material. The chromium determination is a part of a larger multi-element scheme for the determination of 12 elements in biological materials. (Atomindex citation 11:501736)

LBL-50-000 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Membrane Bioenergetics Group.
Jul 79, 23p
Contract W-7405-ENG-48
Microfiche copies only.

The research reported is concerned with the organization and function of membranes as they relate to the transduction of energy by membrane-bound catalysts; and the interaction of environmental pollutants - particularly those that are free radicals. (ERA citation 05:010604)

PAT-APPL-6-101 074 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Nuclease-Resistant Hydrophilic Complex of Polyriboinosinic-Polyribocytidylic Acid.
Patent Application,
Hilton B. Levy. Filed 7 Dec 80, 10p PB80-204860
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A nuclease-resistant hydrophilic complex of polyriboinosinic-polyribocytidylic acid, poly-1-lysine and carboxymethylcellulose, and injectable preparations thereof in a pharmaceutically acceptable aqueous carrier such as saline solution. When administered to a human or non-human primate host, the complex is effective in inducing the synthesis in such host of antiviral levels of interferon.

PB80-194673 PC **A04**/MF **A01**
New York Univ. Medical Center, NY.
Methods of Producing Human Interferon.
Annual progress rept. 21 Jan 78-15 Oct 79,
Jan T. Vilcek, Edward A. Havell, Y. K. Yip, and Wallace McKeehan. 18 Oct 79, 53p DAB-ASP-12-43
Contract N01-AI-0-2169
See also report dated Mar 77, PB-290 600.

One project involved the selection and amplification of a diploid cell strain suitable for large-scale production of human fibroblast interferon. A cell strain termed FS-35 has been selected for this purpose on the basis of the earlier results. Several hundred ampules of frozen cell stock have been prepared at population doubling levels 10, 13 and 17. These cells are already being distributed to qualified investigators by NIAID. Another major field of activity was the development of purification procedures for fibroblast interferon, suitable for the handling of large volumes of material destined for clinical use. Two methods were found to be particularly suitable for this purpose: an adaptation of adsorption chromatography on controlled pore glass and modified gel filtration procedure.

PB80-196751 PC **A06**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Bacteriology.
Biological Systems for Lignocellulose Conversion.
Progress rept. no. 7, 1 Aug 79-31 Jan 80,
J. G. Zeikus, and T. K. Kirk. 1980, 111p NSF/RA-800061
Grants NSF-AER75-22789, NSF-PFR79-10084
Prepared in cooperation with Forest Products Lab., Madison, WI.

Microbiological approaches to the utilization of lignocellulosic biomass are reported. The two biological systems examined were Phanaerochate chrysosporium and Clostridium thermocellum. Detailed studies of lignin metabolism by P. chrysosporium and of cellulose metabolism by C. thermocellum were undertaken. Specific tasks in the studies of lignin metabolism included (1) determining amino acid pools and total protein in cultures of P. chrysosporium on the cultures shift from pre-ligninolytic to ligninolytic (primary to secondary metabolic); (2) comparing the kinetics of suppression of ligninolytic activity by nitrogenous compounds with that caused by the protein-synthesis inhibitor cycloheximide, in ligninolytic cultures of P. chrysosporium; and (3) attempting to trigger early appearance of ligninolytic activity in cultures of P. chrysosporium using proteases or protease-inducers, thereby evaluating the possibility that proteases provide the connection between the onset of lignin degradation and nitrogen starvation. In the studies on cellulose metabolism, the extracellular cellulase activities of C. thermocellum and Trichoderma viride were compared. The relationship between ethanol yields and catabolic enzyme activities of C. thermocellum and Thermoanaerobium brockii were determined. A thermophilic co-culture that ferments both hemicellulose and cellulose to ethanol in high yield was established.

6B. Bioengineering

CONF-791002-5 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Instrumental Inhaled Smoke Dosimeter for the Quantitative Characterization of Aerosol Exposures.
R. A. Jenkins, and T. M. Gayle. 1979, 27p
Contract W-7405-ENG-26
19. annual Hanford life sciences symposium, Richland, WA, USA, 22 Oct 1979.

The design and performance of an instrument package which has been successfully used to quantify the amount of cigarette smoke inhaled by experimental animals under chronic conditions are described. (ERA citation 05:023034)

N80-27075/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Error Analysis and Corrections to Pupil Diameter Measurements with Langley Research Center's Oculometer.
C. L. Fulton, and R. L. Harris, Jr. May 80, 17p
NASA-TM-81806

Factors that can affect oculometer measurements of pupil diameter are: horizontal (azimuth) and vertical (elevation) viewing angle of the pilot; refraction of the eye and cornea; changes in distance of eye to camera; illumination intensity of light on the eye; and counting sensitivity of scan lines used to measure diameter, and output voltage. To estimate the accuracy of the measurements, an artificial eye was designed and a series of runs performed with the oculometer system. When refraction effects are included, results show that pupil diameter is a parabolic function of the azimuth angle similar to the cosine function predicted by theory: this error can be accounted for by using a correction equation, reducing the error from 6% to 1.5% of the actual diameter. Elevation angle and illumination effects were found to be negligible. The effects of counting sensitivity and output voltage can be calculated directly from system documentation. The overall accuracy of the unmodified system is about 6%. After correcting for the azimuth angle errors, the overall accuracy is approximately 2%.

PAT-APPL-6-153 246 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
An Implantable Electrical Device.
Patent Application,
M. D. Jhabvala. Filed 27 May 80, 12p N80-27073/9, NASA-CASE-GSC-12560-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A fully implantable and self-contained therapeutic device for stimulating the regeneration of severed nerves by electrical energy is disclosed. The device is composed of a flexible electrode array for surrounding damaged nerves and a signal generator for driving the electrode array with periodic electrical impulses of nanoampere magnitude to induce regeneration of the damaged nerves.

PATENT-4 204 544 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, CA.
Simultaneous Muscle Force and Displacement Transducer.
Patent,
C. Feldstein, G. W. Lewis, and V. H. Cullier. Filed 30 Sep 77, patented 27 May 80, 5p N80-27072/1, PAT-APPL-838 308
Supersedes PAT-APPL-838 308-77, N80-12730 (18 - 03, p 0376). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A myocardial transducer for simultaneously measuring force and displacement within a very small area of myocardium is disclosed. The transducer comprised of an elongated body forked at one end to form an inverted Y shaped beam with each branch of the beam constituting a low compliant tine for penetrating the myocardium to a predetermined depth. Bonded to one of the low compliance tines is a small piezoresistive element for converting a force acting on the beam into an electrical signal. A third high compliant tine of the transducer, which measures displacement of the myocardium in a direction in line with the two low compliant tines, is of a length that just pierces the surface membrane. A small piezoresistive element is bonded to the third tine at its upper end where its bending is greatest. Displacement of the myocardium causes a deformation in curvature of the third tine, and the second small piezoresistive element bonded to the surface of its curved end converts its deformation into an electrical signal.

PB80-197056 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Fibers and Polymers Lab.
Nonthrombogenic Collagen. Contribution of Individual Processing Steps.
Annual progress rept. no. 5, 1 Jul 78-30 Jun 79,
I. V. Yannas, M. J. Forbes, and E. W. Salzman. Jun 79, 40p NIH-N01-HV-4-2969-5
Contract N01-HV-4-2969

Previously we have shown that collagen can be converted into a non-platelet-aggregating variant by precipitation with chondroitin 6-sulfate, a glycosaminoglycan (GAG), at pH 3.2. This in vitro finding has led to development in the laboratory of two processes for fabrication of experimental blood-compatible tubing. In order to establish the reproducibility of hematological properties of the fabricated tubes the authors undertook a detailed study of the individual process steps by which they convert collagen to its thromboresistant variant. The authors find that chondroithin 6-sulfate, and possibly also crosslinking with glutaraldehyde, function by interfering with swelling/deswelling equilibria of collagen particles in aqueous media.

PB80-197148 PC **A06/MF A01**
Andros, Inc., Berkeley, CA.
Electrical Energy Transmission Technique Development.
Annual rept. 1 Jun 78-31 May 79,
Peer M. Portner, David H. LaForge, Sylvain Fitzsele, Paul A. Maeder, and James Lee. 27 Jun 79, 109p ARFR-111B, NIH-N01-HV-7-2933-2
Contract N01-HV-7-2933
See also report dated Jun 78, PB80-146954.

The 'belt' skin transformer (BST), consisting of a pair of narrow, concentric coils around the waist, is under development as part of the Andros permanent implanted Left Ventricular Assist System (LVAS). The high, stable coupling inherent in the BST concept avoids many difficulties seen in earlier skin transformer designs. Adoption, this year, of a single-turn design for the implanted secondary greatly simplified the task of achieving electrical performance goals in a belt having the necessary compliance, small cross section, tissue compatibility and endurance. Several belt geometries and surfaces have been evaluated in 120 implant months experience in dogs. A circumthoracic implant site permits periodic tests of belt elasticity by measuring chest compliance. An implanted reactive load permits chronic excitation and in situ electrical measurement. Data is presented supporting choice of straight, smooth Silastic surface.

6C. Biology

AD-A085 975/1 PC **A02/MF A01**
Baylor Coll of Medicine Houston TX
Biophysical Study of Nerve Axon.
Final rept. 1 Jan 77-28 Feb 80,
Donald C. Chang. 29 Feb 80, 13p
Contract N00014-77-C-0092

This report summarizes research on the following topics: Resting Potential in Squid Giant Axon--Evidence against the diffusion potential hypothesis; Pulsed Nuclear Magnetic Resonance Studies of Squid Giant Axon; Studies of Na23 Nuclei in Skeletal Muscle by Fast Fourier Transform NMR and Spin-Echo NMR; Ion Competition Between Na(+) and K(+) Ions in the Pathway of Early Conductance (i.e., Na(+) Channel) in Squid Giant Axon; and Kinetics of Early Current and Its Concentration Dependency--Development of a TTX (Tetrodotoxin)-subtraction method.

AD-A085 976/9 PC **A02/MF A01**
Alaska Univ Anchorage Arctic Environmental Information and Data Center
Photoperiod and Fur Lengths in the Arctic Fox (Alopex lagopus L.),
Larry S. Underwood, and Patricia Reynolds. May 80, 19p
Contract N00014-77-C-0234

Pelage is seasonally dimorphic in the Arctic fox. During the winter, fur lengths are nearly double similar values taken during the summer. Considerable site-specific differences in fur length are noted. In general, body sites which are exposed to the environment when the fox lies in a curled position show greater fur lengths in all seasons and greater seasonal variations than body sites that are more protected during rest. Well-furred sites may tend to conserve heat during periods of inactivity, and scantily furred sites may tend to dissipate heat during periods of exercise. Growth of winter fur may compensate for the severe cold of the arctic winter. Changes in fur lengths indicate a definite pattern in spite of individual variations. During the fall, fur lengths seem to lag behind an increasing body-to-ambient temperature gradient. Both body-to-ambient temperature gradients and fur lengths peak during December through February. From March through June, gradual environmental warming is accompanied by a decrease in average fur lengths. Thus, there appears to be a parallel between the body-to-ambient temperature gradient and fur length -- growth of fur parallels annual changes in ambient temperature and photoperiod. It may be that the onset of fall molt in the Arctic fox is indigenously controlled, while spring molt may be more related to either changes in temperature, photoperiod, or both.

CONF-7810136-2 PC **A03/MF A01**
Oak Ridge National Lab., TN.
Limits to Life at Low Temperatures and at Reduced Water Contents and Water Activities.
P. Mazur. 1978, 47p
Contract W-7405-ENG-26
College Park colloquium on chemical evolution, limits of life, College Park, MD, USA, 18 Oct 1978.

Liquid water is generally considered an absolute requisite for functional terrestrial life; consequently, life is expected to function only over the range of temperatures that permit its existence. These limits, however, do not apply to cell survival. Some can survive the closest attainable approach to 0 exp 0 K and some can survive the loss of over 99% of their water. The author discusses various aspects of the phenomena of cell survival at low temperatures. Included are sections on events occurring during freezing and thawing of cells, the consequences of cell dehydration, limits to cell survival, and minimum temperatures for cell growth. (ERA citation 05:024702)

CONF-7909135-1 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Approaches to the Preservation of Human Granulocytes by Freezing.
J. Frim, and P. Mazur. 1979, 13p
Contract W-7405-ENG-26
Symposium on storage and preservation of granulocytes, Atlanta, GA, USA, 30 Sep 1979.

Because of its simplicity, the FDA assay can be used effectively as a screening test to eliminate procedures and treatments that are damaging to cells. In this context, a number of conclusions can be drawn from the data presented: (1) Exposure to 1 and 2 M glycerol at room temperature damages human granulocytes in a few minutes. Reducing the exposure temperature to 0 exp 0 C reduces the amount of injury substantially. (2) Human granulocytes respond to freezing and thawing in a manner typical of many mammalian cells in that they exhibit a maximum in survival at an optimum cooling rate slightly above 1 exp 0 C/min when combined with rapid warming. The use of rapid warming and a high (2 M) concentration of glycerol reduces the dependence of survival on cooling rate by broadening the range of rates over which survival is relatively high. (3) Human granulocytes show some sensitivity to dilution stresses since survival depends somewhat on the concentration of glycerol used and the severity of the dilution procedure. The reasons for the sharp decrease in cell viability following incubation of frozen-thawed granulocytes at 37 exp 0 C are not known. One possibility is that the phosphate buffered saline suspending medium used is not suitable for incubation at 37 exp 0 C. A second possibility is that some cell injury is not expressed at 0 exp 0 C and remains undetected by the FDA assay until the cells are incubated at 37 exp 0 C. There is also the possibility that lysosomal enzymes released by a few damaged cells in a sample will cause additional damage in other cells at 37 exp 0 C. (ERA citation 05:023021)

CONF-7910147-1 MF **A01**
Oak Ridge National Lab., TN.
Home Range and Diet of Bobcats in Eastern Tennessee.
J. T. Kitchings, and J. D. Story. 1979, 11p
Contract W-7405-ENG-26
Bobcat research conference, Front Royal, VA, USA, 15 Oct 1979.
Microfiche copies only.

Interest in the status of the bobcat (Lynx rufus rufus) on the Department of Energy's Oak Ridge Reservation has stemmed concomitantly from a desire to learn more of the habits of this animal and to monitor the effects of anthropogenic activities on these habits. We have begun a long-term program to acquire data on home ranges, population density, habitat usage, spatial distribution of individuals, movement patterns, predator-prey interaction and food habits. (ERA citation 05:022968)

COO-4159-5 PC **A02/MF A01**
Sloan-Kettering Inst. for Cancer Research, New York.
Genetic and Developmental Study of a Complex Locus in the House Mouse. Progress Report, August 1, 1978-June 1, 1979.
D. Bennett. Jun 79, 5p
Contract AC02-77EV04159

More than 50 T/t-complex and other mouse chromosome variants are being maintained for genetic study and for distribution to other investigators. Mapping experiments within a viable t-haplotype have been completed, and show conclusively that this variant virtually completely suppresses recombination for three centimorgans distal to itself, but enhances recombination in a 4 centimorgan region distal to that. Complementation tests of a new lethal t-haplotype, t/sup w/ exp 75 , which have shown that it contains two lethal factors characteristic of both the t/sup w/ and the t/sup w exp 5 / complementation groups have been completed. Deletion mapping has been used to study transmission ratio distortion, and these experiments show clearly that a gene or genes on the chromosome homologous to the t-bearing one have a pronounced effect in governing the degree of distortion. Other experiments to extract and analyze t-haplotypes from wild populations are continuing, as in the analysis of viable recombinant t-variants produced by existing lethal t-haplotypes. (ERA citation 05:024709)

DOE/EV/02472-6 PC **A02/MF A01**
Harvard Univ., Cambridge, MA. Museum of Comparative Zoology.
Study of Mathematical Models of Mutation and Selection in Multi-Locus Systems. Annual Progress Report, April 1, 1979-March 31, 1980.
R. C. Lewontin. 1980, 10p
Contract AC02-76EV02472

During the past year, research has been devoted to two topics with principal results as follows: (1) an analytic and computer study was carried out of the growth of a population like the human population, which has age distributed mortality and fecundity, but for which the rates of birth and death are varying from period to period in time. The entries in the Leslie Matrix were considered to vary by a Markov process. The result is that although the expectation of the population size may grow, the numbers may decrease to zero with high probability and that, in general, the population size at time t depends upon the logarithm of growth rates, and ln lambda/sub t/ is asymptotically normally distributed; and (2) numerical studies were undertaken of 2 locus genetic models with asymmetric fitness matrices created by perturbing the parameters of symmetric fitness matrices where solutions are known analytically. The general results are that linkage equilibrium solutions do not exist at all for such asymmetric models, that the value of D at loose linkage is about the order of the asymmetry and that for asymmetric models there is a critical value of recombination below which new equilibria come into existence beside the one that exists for all r. (ERA citation 05:024667)

N80-27069/7 PC **A03/MF A01**
Oregon Univ. Health Sciences Center, Portland. Dept. of Neurology.
Countercurrent Distribution of Biological Cells.
Final Report, 1 Jan. 1978 - 31 Mar. 1979.
D. E. Brooks. Mar 79, 46p NASA-CR-161487
Contract NAS8-32817

A neutral polymer phase system consisting of 7.5 percent dextran 40/4.5 percent PEG 6, 0.11 M Na phosphate, 5 percent fetal bovine serum (FBS), pH 7.5, was developed which has a high phase droplet electrophoretic mobility and retains cell viability over many hours. In this and related systems, the drop mobility was a linear function of drop size, at least in the range 4-30 micron diameter. Applications of and electric field of 4.5 v/cm to a system containing 10 percent v/v bottom phase cleared the system more than two orders of magnitude faster than in the absence of the field. At higher bottom phase concentrations a secondary phenomenon intervened in the field driven separations which resulted in an increase in turbidity after clearing had commenced. The increase was associated with a dilution of the phase system in the chamber. The effect depended on the presence of the electric field. It may be due to electroosmotic flow of buffer through the Amicon membranes into the sample chamber and flow of phase system out into the rinse stream. Strategies to eliminate this problem are proposed.

N80-27070/5 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.

Effect of Sharply Lowered Muscular Activity on the Thyroid Gland of the White Rat.
K. Bekishev. Apr 80, 9p NASA-TM-76114
Contract NASW-3199
Transl. Into English from Izv. Akad. Kaz. Khim. Ssr, (USSR) No. 2, Mar. - Apr. 1978 p 75-78. Transl. By Kanner (Leo) Associates, Redwood, Calif.

The effect of hypokinesia on the thyroid gland of 200 white rats was studied. The rats were kept in 16x6x6 cm cages for 90 days. The functional activity of the thyroids increased after 24 hrs of partial immobilization and peaked after 15 days. After 30 days of immobilization, the functional activity returned to normal in one third of the test animals and after 60 days in all animals. After 15 days of immobilization, the test animals began to lose weight (in comparison to the controls) and remained underweight for the rest of the test period (up to 90 days). When returned to normal conditions, they caught up with and even overtook in weight the control animals after about 1 month. All changes produced by hypokinesia were reversible after 1 month.

PB80-199706 Not available NTIS
Environmental Research Lab., Gulf Breeze, FL.
Concurrent Neoplastic and Protistan Disorders in the American Oyster (Crassostrea Virginica).
Journal article,
John A. Couch, and James T. Winstead. c1979, 8p EPA-600/J-79-099
Prepared in cooperation with University of Southern Mississippi, Hattiesburg. Dept. of Biology.
Pub. in Haliotis 8, p249-254 1979.

One of 373 oysters examined as part of a histological survey of oysters from Apalachicola Bay, Florida, USA, had a concurrent blood cell proliferative disorder and a protistan infection. The neoplastic blood cells (leukocytes) were found throughout the vesicular connective tissues and blood spaces in sections of the oyster. These proliferating cells resembled the neoplastic cells described by Couch (1969) and Farley (1969) from other specimens of Crassostrea virginica from Chesapeake Bay, Maryland, USA. Mitotic figures were abundant in foci of the neoplastic tissue. Epithelial tissues of the gut of this oyster were infected by spore and schizogonic stages of Dermocystidium marinum, a presumed pathogenic protist of oysters. Spores of this protist and other proliferative stages were observed in connective tissues and blood spaces. There was no morphological evidence that the neoplastic blood cells were related to the protist life cycle stages.

PB80-201056 PC **A02**
New York Sea Grant Inst., Albany.
Access to Great Lakes Salmonid Fishing Via Private Lands: A Study of New York's Riparian Landowners,
Tommy L. Brown, and Daniel J. Decker. May 79, 11p NYSG-RR-80-10, NOAA-80052801
Pub. in Proceedings of Conference on Great Lakes Research (22nd), 'Recreation Impacts: The Great Lakes Ecosystem,' p37-44 May 79.

This study is the result of one of several grants beginning in 1972 from the New York Sea Grant Institute, designed to assess and evaluate various recreational aspects of the Great Lakes salmonid fisheries in New York. The primary objective of this study was to determine potential legal arrangements and agency policies that would be most acceptable to riparian landowners in exchange for public fishing access agreements.

PB80-201205 PC **A07**/MF **A01**
Idaho Chapter of the Wildlife Society, Boise.
Workshop on Raptors and Energy Developments.
Final rept.,
Richard P. Howard, and James F. Gore. Jan 80, 130p ICTWS-1
Proceedings of a workshop held in Boise, Idaho, January 25-26, 1980. Sponsored in part by Fish and Wildlife Service, Boise, ID., Bonneville Power Administration, Portland, OR., and Idaho Power Co., Boise.

The report covers State-of-the-Art in the Northwestern U.S. concerning the Energy Development impacts on Raptors. The report includes information on raptor electrocutions, management techniques useful in protecting and/or enhancing raptor use of energy relate and facilities and general raptor management and scientific data. Eleven papers are presented with significant bibliography.

PB80-201361 PC **A02**
Florida State Univ., Tallahassee. Dept. of Biological Science.
Trophic Resource Utilization by Three Species of Sciaenid Fishes in a Northwest Florida Estuary,
Peter F. Sheridan. Jun 79, 17p NOAA-80052704
Grants NOAA-04-3-158-43, EPA-R-803339
Pub. in Northeast Gulf Science, v3 n1 p1-15 Jun 79.

Food habits of Atlantic croaker (Micropogonias undulatus), spot (Leiostomus zanthurus), and sand seatrout (Cynoscion arenarius) were examined in 1976 collections from Apalachicola Bay, Florida. Ontogenetic, spatial, and temporal aspects of diet were considered. Interspecific diet comparisons indicated little overall trophic overlap among the three sciaenids, but diets of small croakers (10-59 mm) and spot (20-79 mm) were significantly correlated.

PB80-201593 PC **A07**/MF **A01**
National Marine Fisheries Service, Washington, DC. Resource Statistics Div.
Fisheries of the United States, 1979,
Current fishery statistics,
Joseph Pileggi, and B. G. Thompson. May 80, 150p NOAA-NMFS-CFS-8000, NOAA-80052711
See also report dated Apr 79, PB-297 083.

This is a preliminary report for 1979 on commercial and marine recreational fisheries of the United States and foreign catches in the U.S. fishery conservation zone (FCZ). This annual report provides timely answers to frequently asked questions for the previous year. A section of this publication briefly describes the 1978-79 survey of the Nation's marine recreational fishery. The study also discusses the national saltwater angling surveys of 1960, 1965, and 1970; the 1974 Northeastern Regional Survey; and the 1975 Southeastern Regional Survey.

PB80-202294 PC **A11**/MF **A01**
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
California's Northern Anchovy Fishery: Biological and Economic Basis for Fishery Management.
Technical memo.,
Daniel D. Huppert, Alec D. MacCall, Gary D. Stauffer, Keith R. Parker, and Jane A. McMillan. Apr 80, 244p NOAA-TM-NMFS-SWFC-1, NOAA-80061004

The successful implementation of the Anchovy Fisheries Management Plan will require unity of purpose between the Federal management regulations and the regulations enforced by the State of California. Because the Fishery Management Plan is directed toward a fish stock which resides in the fishery conservation zone of Mexico as well as in the U.S. Zone, cooperation and common objectives between the United States and Mexico will be necessary to the successful international management of the anchovy resource. The management unit chosen for this Plan is the central subpopulation of northern anchovy (Engraulis mordax) which extends from approximately San Francisco to Punta Baja, Baja California, Mexico.

UCLA-12-1217 PC **A08**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Annual Progress Report, July 1, 1978-June 30, 1979.
1979, 160p
Contract EY-76-C-03-0012

Research for FY 1979 is reported. The Laboratory's three major research programs are: Biomolecular and Cellular Science with reference to health related energy problems; Environmental Biology focusing on desert ecosystems, and Nuclear Medicine. (ERA citation 05:023014)

6E. Clinical Medicine

AD-A085 856/3 MF **A01**
Harvard School of Public Health Boston MA
Rickettsial Diseases: Scrub Typhus and Trench Fever.
Final rept. 1 Feb 75-31 Dec 77,
Susumu Ito. May 79, 14p
Contract DAMD17-75-C-5038
Availability: Microfiche copies only.

This study was directed towards the isolation of rickettsial antigens and detection of antibodies. Stock supplies of Gilliam, Kato and Karp strains of Rickettsia tsutsugamushi were propagated in embryonated chick eggs and used for infecting cultured cells. Infected McCoy cell extracts containing soluble anti-gen as well as infected yolk sacs were inoculated into guinea pigs to produce antisera. However, the yield of antibody was low and only detectable by fluorescent antibody techniques. More recently, progress was made in growing R. tsutsugamushi in BHK sub 21 cells as a monolayer or in suspension cultures. Irradiated cells seem to enhance rapid rickettsial proliferation Solubilization after freezing and thawing and by sonication and Triton X-11 treatment was used to isolate soluble antigen for characterization and further purification. In these studies, infected cells as well as isolated samples used in the studies were fixed and examined by electron microscopy to monitor the structure of the organism and the host cell as well as some of the isolated and purified samples.

AD-A085 937/1 PC **A02**/MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Comparison of Some Physical and Immunologic Properties of a Phase I and a Phase II Q Fever Vaccine in Guinea Pigs.
Interim rept.,
J. W. Johnson, R. F. Wachter, G. A. Higbee, and C. E. Pedersen, Jr. 9 May 80, 14p

A highly purified phase I Q fever vaccine was evaluated by comparing its physical, serologic and protective properties with those of a phase II vaccine currently in use. The concentration of rickettsiae was approximately the same in both preparations. The phase I vaccine had a median protective dose in guinea pigs of 1.8 micrograms, compared with 27.3 micrograms needed for the phase II vaccine. Median doses required for detectable serum complement-fixing, microagglutinating and immunofluorescing antibodies were also lower by factors of 1.5 to 20 times for the phase I vaccine. (Author)

AD-A085 938/9 PC **A02**/MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Effect of Adrenalectomy on Cadmium- and Turpentine-Induced Hepatic Synthesis of Metallothionein and Alpha(sub 2)-Macrofetoprotein in the Rat.
Interim rept.,
P. Z. Sobocinski, W. J. Canterbury, Jr., G. L. Knutsen, and E. C. Hauer. 13 May 80, 16p

Recent reports have strongly implicated glucocorticoids in the induction of hepatic metallothionein synthesis and hypozincemia which occurs in certain pathophysiologic conditions. Studies were performed in rats to determine the effect of adrenalectomy and glucocorticoid treatment on the hepatic accumulation of metallothionein subsequent to the administration of cadmium and turpentine, two diverse substances known to induce hypozincemia and hepatic synthesis of metallothionein as well as alpha-2-macrofetoprotein in intact rats. By 24 h, both substances induced significant hypozincemeia, hepatic metallothionein accumulation, and a severe tissue inflammatory response in adrenalectomized rats. Adrenalectomy only prevented the increase in plasma alpha-2-macrofetoprotein concentration. Results indicate that hepatic synthesis of alpha-2-macrofetoprotein, but not metallothionein is mediated by adrenal hormones. Thus, glucocorticoids do not play a 'vital' role in hepatic metallothionein accumulation or hypozincemia induced by inflammatory stress, as previously postulated. (Author)

AD-A085 939/7 PC **A02**/MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Aerosol Stability and Respiratory Infectivity of Japanese B Encephalitis Virus.
Interim rept.,

Edgar W. Larson, Joseph W. Dominik, and Theodore W. Sione. 30 May 80, 25p

Experiments were conducted to examine the aerosol stability and respiratory infectivity of Japanese B encephalitis virus. At 75 F, survival of the virus as aerosol was inversely related to relative humidity. After correction for physical decay, the mean virus half-lives of the virus were 28, 38 and 62 min at relative humidities of 80, 55 and 30%, respectively. Virus recoveries as aerosol at 4 min after dissemination generally exceeded the theoretical limit of 100%, based on the amount disseminated, to suggest that the process of dissemination operated to deagglomerate or release bound virus from the tissue cells in suspension. Swiss-ICR mice and golden Syrian hamsters were highly susceptible to lethal infections after respiratory challenge. Hartley strain guinea pigs and Fisher-Dunning rats, while infected, based on seroconversion observations, survived the infections. Deaths occurred in squirrel monkeys only after exposure to a high aerosol dose of virus (million PFU). Studies of the virus concentration dynamics and histopathologic findings in mouse tissues after aerosol challenge supported a hypothesis for direct transport of virus across the foramina of the cribriform plate to the tissues of the central nervous system to produce primary encephalitis. (Author)

AD-A085 957/9 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Comparison of Gutta Percha Filling Techniques. Part 1. Compaction (Mechanical), Vertical (Warm), and Lateral Condensation Techniques.
Rept. for Jan-Jun 80,
M. Wong, D. D. Peters, and L. Lorton. Jun 80, 25p
Includes envelope containing 16 photographs.

An in vitro technique was developed to evaluate the ability of various filling techniques to fill an artificial standard canal system. No significant difference was noted in volume changes over a two-week period between lateral condensation, vertical (warm) condensation or compaction (mechanical) condensation. The ability of the techniques to replicate the canal was statistically analyzed. It was found that the compaction technique was significantly better than the lateral technique (p less than 0.01), and the vertical technique was significantly better than compaction technique (p less than 0.001). The compaction technique was significantly the fastest. (Author)

AD-A085 958/7 PC **A03/MF A01**
Army Inst of Dental Research Washington DC
Comparison of Gutta Percha Filling Techniques. Part 2. Three Chloroform-Gutta Percha Filling Techniques.
Rept. for Jan-Jun 80,
M. Wong, D. D. Peters, L. Lorton, and W. E. Bernier. Jun 80, 30p
Includes envelope containing 9 photographs.

An artificial standard root canal system was used to evaluate the ability of gutta percha filling techniques. No significant difference was noted in the abilities of chloropercha, Kloroperka, and chloroform-dip to replicate the canal system. All three chloroform techniques replicated the system significantly better than lateral condensation. In volumetric evaluation, the chloropercha fills decreased in volume 12.42% in 2 weeks while Kloroperka decreased only 4.86% & chloroform-dip only 1.40%. How significant the 1.40% shrinkage is in relation to seal is unknown. (Author)

AD-A085 977/7 PC **A02/MF A01**
Virginia Mason Research Center Seattle WA
Control of the Inflammatory Process.
Annual rept. 1 Apr 79-31 Mar 80,
John C. Houck. 4 Apr 80, 11p
Contract N00014-77-C-0262

We have purified the factor released by lung cells during their cultivation in vitro which permit the mitotic activity of alveolar macrophages. This factor has a molecular weight of 68,000 daltons with an isoelectric point of 4.2 and is in equilibrium with as much as 20% of the total molecular species as dimers, trimers and tetramers. This activity appears to possess the ability to inhibit trypsin and elastase but not chymotrypsin. We have also purified to electrophoretic homogeneity a macromolecular factor from aqueous extracts of lung which has a molecular weight of 82,000 daltons and also an isoelectric point of pH 4.2. This factor increases the permeability of the microcirculation in rat skin in vivo by degranulating mast cells so that they release histamine. This permeability factor is inhibited by antihistamines and also by premixture with pepstatin, an acid protease inhibitor which also is chemotactic for polymorphonuclear leukocytes in vitro. The purified permeability factor from lung has no proteolytic activity at any pH against either synthetic or natural substrates, however. This permeability producing activity appears to be concentrated in the lysosomes of alveolar macrophages. Pepstatin also possesses the ability to inhibit the permeability factor found in testicular hyaluronidase preparations; this permeability factor also degranulates mast cells and obviously pepstatin is an important inhibitor of mast cell degranulation, and hence, histamine release.

AD-A086 027/0 PC **A02/MF A01**
Naval Dental Research Inst Great Lakes IL
Comparison of the Effects of Ethane-1-Hydroxy-1,1-Diphosphonate and Dichloromethylene Diphosphonate upon Periodontal Bone Resorption in Rice Rats (Oryzomys palustris).
Research progress rept.,
E. P. Leonard, W. V. Reese, and E. J. Mandel. 1979, 6p Rept no. NDRI-PR-80-04
Pub. in Archives of Oral Biology, v24 p707-708 1979.

No abstract available.

AD-A086 031/2 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Marginal Sealing Quality of IRM and Cavit as Assessed by Microbial Penetration.
Rept. for Jan-Jun 80,
Thomas D. Blaney, D. D. Peters, Jean Setterstrom, and W. E. Bernier. Jun 80, 24p

Two of the most frequently used temporary materials are a polymer-reinforced zinc oxide-eugenol intermediate restorative material (IRM) and Cavit, a premixed noneugenol paste containing zinc oxide, calcium sulfate, zinc sulfate, glycol acetate, polyvinyl acetate, polyvinyl chloride acetate, tri-ethanolamine, and red pigment. The ability of Proteus vulgaris to penetrate the seal provided by IRM and Cavit was investigated by using an in vitro model system consisting of extracted molar teeth embedded in acrylic. All temporaries were allowed to set for 24 hours next to a cotton pellet containing Camphorated Monochlorophenol (CMCP) or saline. IRM which had set next to CMCP provided a significantly better seal after 3 weeks than IRM which had set next to saline, or Cavit which had set next to CMCP. Cavit placed next to saline was the least effective seal.

AD-A086 032/0 PC **A02/MF A01**
School of Aerospace Medicine Brooks AFB TX
Continuity of Care: Cliche or Viable Nursing Concept,
Rosa Lee Cook. 1979, 6p Rept no. SAM-TR-282
Pub. in Nursing Leadership, v2 n4 p21-25 Dec 79.

No abstract available.

AD-A086 185/6 PC **A03/MF A01**
Naval Dental Research Inst Great Lakes IL
The Health of Naval Recruits: Dental Caries.
Research progress rept.,
J. C. Cecil, M. R. Wirthlin, R. G. Walter, and E. J. Mandel. May 80, 30p Rept no. NDRI-PR-80-05

An epidemiological survey of naval recruits disclosed a high prevalence of unfilled decayed teeth. Those men with the most decayed teeth and the deepest decayed teeth had the highest incidence of new cavities in their first six months of service. There was a positive relationship of these indices of poor dental health with naval recruiters' indicators of low performance potential. This report confirms past surveys that a small portion of naval recruits consume a large proportion of dental care resources. It is recommended that the caries-prone men be given extra caries-preventive treatments at their most caries-prone anatomical sites. (Author)

AD-A086 232/6 PC **A03/MF A01**
Naval Health Research Center San Diego CA
ELISA (Enzyme-Linked Immunosorbent Assay).
Final rept.,
Richard L. Hilderbrand. 1979, 43p Rept no. NAVHLTHRSCHC-78-26
Pub. in Rapid Diagnosis in Infectious Disease, p71-88 1979.

No abstract available.

AD-A086 233/4 PC **A03/MF A01**
Naval Health Research Center San Diego CA
Counterimmunoelectrophoresis and Double Immunodiffusion.
Final rept.,
Earl A. Edwards. 1979, 38p Rept no. NAVHLTHRSCHC-78-21
Pub. in Rapid Diagnosis in Infectious Disease, p19-37 1979.

No abstract available.

AD-A086 235/9 PC **A06/MF A01**
Naval Medical Research Unit No 3 FPO New York 09527
(Review Article) The Epidemiology of Tick-Borne Crimean-Congo Hemorrhagic Fever in Asia, Europe, and Africa.
Technical rept.,
Harry Hoogstraal. 1979, 119p Rept nos. NAMRU-3-TR-4/80, NAMRU-3-ACC-1178
Pub. in Jnl. of Medical Entomology, v15 n4 p307-417, 22 May 79.

No abstract available.

AD-A086 236/7 PC **A02/MF A01**
Naval Medical Research Unit No 3 FPO New York 09527
Ticks and Spirochetes.
Technical rept.,
Harry Hoogstraal. 1979, 6p Rept nos. NAMRU-3-TR-6/80, NAMRU-3-ACC-1181
Pub. in Acta Tropica, v36 p133-136 1979.

No abstract available.

AD-A086 246/6 PC **A02/MF A01**
Walter Reed Army Inst of Research Washington DC
Platelet Serotonin Changes in Dogs with Prosthetic Aortic Grafts,
G. Patrick Clagett, Marianne Russo, Howard Hufnagel, George J. Collins, and Norman M. Rich. 1980, 9p
Pub. in Jnl. of Surgical Research, v28 p223-229 1980. Presented at the Annual Meeting of the Association for Academic Surgery, Great Gorge, NJ, 11-14 Nov 79.

No abstract available.

AD-A086 251/6 PC **A02/MF A01**
Walter Reed Army Inst of Research Washington DC
Kinetics of Peripheral Blood Leukocyte Alterations in Thai Children with Dengue Hemorrhagic Fever,
Robert A. Wells, Robert McN. Scott, Katchrinee Pavanand, Varayuth Sathitsathein, and 1980, 8p
Pub. in Infection and Immunity, v28 n2 p428-433 May 80.

No abstract available.

AD-A086 252/4 PC **A02/MF A01**
Army Aeromedical Research Lab Fort Rucker AL
Common Problems in the Medical Care of Pilots,
Lawrence R. Whitehurst. 1979, 14p Rept no. USAARL-80-5
Pub. in American Family Physician, v20 n3 p133-138 Sep 79.

No abstract available.

AD-A086 256/5 PC **A03/MF A01**
Smithsonian Institution Washington DC
Medical Entomology Project.
Rept. no. 5 (Annual), 1 Jan-31 Dec 79,
Oliver S. Flint, Jr. Jan 80, 30p
Contract DAMD17-74-C-4086

The Medical Entomology Project (MEP), a cooperative venture between the Smithsonian Institution

and the U.S. Army Medical Research and Development Command, conducts biosystematic research on arthropods of medical importance to the Army. MEP fulfills this requirement by performing biosystematic studies on important groups of vectors such as anopheline vectors of malaria and culicine vectors of arbovirus diseases, providing information on potential vectors for the guidance of military field research teams and other governmental agencies and preparing monographs and technical papers which summarize data on the ecology, taxonomy and medical importance of arthropod vectors in various regions of the world. In addition, MEP performs curation and research on the national collection of mosquitoes at the National Museum of Natural History (USNM), Smithsonian Institution.

AD-A086 260/7 PC **A04**/MF **A01**
Missouri Univ-Rolla
Feasibility Study on a Process for electroless Metal Deposition in Pits and Fissures of Teeth for Use in Preventive Dentistry.
Annual rept. no. 6, Jul 78-Aug 79,
Thomas J. O'Keefe. Aug 79, 59p
Contract DADA17-73-C-3087

Further studies were undertaken to test the feasibility of using metal films, deposited by electroless or chemical means, for use in the military dental program. The research effort during the past year was concentrated in the following areas: evaluation of the effects of preliminary treatments on the quality of metal plating, the use of alternate or additional etching agents, the testing of alternate reducing agents (other than hydrazine and ferrous sulfate), and morphological and rate studies of the deposited silver films and the effects of additives. (Author)

CEA-CONF-4379 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Biologie.
In Vivo Analysis of Bone Calcium by Local Neutron Activation of the Hand. Results from Osteoporotic and Hemodialysed Patients.
B. Maziere, D. Kuntz, and D. Comar. 1978, 26p
U.S. Sales Only.

Neutron activation analysis can be used to measure the total bone mass or simply the calcium mass or concentration of a bone segment, for example the hand bones or vertebrae. For a number of reasons, dosimetric, technological, but especially physiopathological, we decided to use a local activation technique. In generalized demineralizing diseases, particularly osteoporosis, the calcium content variations of one segment are comparable to those of another, and more generally to the mineral content variations of the whole skeleton. It is true that ideally we should measure the mineral content of the lumbar vertebrae where the metabolic activity is especially high, and where damage may occur sooner or in any case is detected earlier in osteoporosis. However neutron irradiation of the vertebrae meets with certain technical problems and may also present difficulties in the interpretation of results. Furthermore in other bone diseases, hyperparathyroidism for instance and especially renal osteodystrophy, bone mineral loss is particularly premature and pronounced in the hand and we therefore decided for the moment to use the hand for the neutron activation analysis of bone calcium. The technique enabled us to measure the calcium concentration of the hand bones in hemodialysed subjects and in patients with primitive osteoporosis. (Atomindex citation 11:498908)

CEA-CONF-4405 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Rayonnements Ionisants.
Solid-Phase Radioimmunoassay of Serum Thyroxin-Binding Globulin Using the First Antibody Method. Interest in Thyroid Investigation.
M. Lecureuil, G. Crouzat-Reynes, J. C. Besnard, J. Marchand, and J. L. Salard. 1978, 6p
In French.
U.S. Sales Only.

No abstract available.

HRP-0018871/4 PC **A03**/MF **A01**
Wisconsin Univ-Madison. Inst. for Research on Poverty.
Poverty and Health: Children's Medical Care.
Discussion paper,
Myron J. Lefcowitz. 1973, 37p DP-159-73
Sponsored in part by Office of Economic Opportunity, Washington, DC.

A test conducted on a model for children's medical care utilization is discussed. Data from a National Center for Health Statistics Household Health Survey were used. Need, physician supply, family disposable income, and family preference were among the variables included. The income effect on children's visits to physicians was the first question addressed. Based on a multiple classification analysis, the unadjusted income effect was noticeably lessened, except for those children whose annual per capita family income was $2,500 or more (equivalent to a family income of at least $10,000 for a family of four). Most of the reduction was attributed to family preference, as indicated by the number of children in the family and the education of the parents. The effect of other parts of the model on children's visits to physicians was the second question considered. It was discovered that need (indicated by the child's age) and preferences of the family had the greatest effects on children's medical care utilization. It is suggested that the fact that lower income persons visit physicians less frequently is due to their lesser preference for care and not their lesser command of resources.

HRP-0023702/4 PC **A08**/MF **A01**
Virginia Univ., Charlottesville. School of Nursing.
Characteristics and Utilization of Nurse Practitioners.
Final rept.,
Barbara M. Brodie, Jules I. Levine, Robert A. Reid, David W. Sheatsley, and Kathryn F. Miller. Jun 75, 162p
Contract N01-NU-2-4231

This study examines the demographic and occupational characteristics of nurse practitioners (NP's). The data come from questionnaires completed by 820 NP's in Virginia and in the Philadelphia metropolitan area. The purpose of the study was to provide data useful in the formulation of educational policy and in legislative decisionmaking with respect to the training and utilization of NP's and to provide baseline data for future assessments of NP training programs. Topics in the study deal with characteristics of the following: NP's, nonpracticing NP's, physician and practice, patients, and NP employment. Also included are physician and patient attitudes toward NP's; the NP role, including tasks performed, physician evaluation, clinical tasks, and other tasks; and an assessment of NP programs. The data are presented in 112 tables. The interview schedules are not included, but may be obtained from the University of Virginia.

HRP-0025351/8 PC **A02**/MF **A01**
Maxwell School of Citizenship and Public Affairs, Syracuse, NY.
Methodological Extensions to a Markovian Health Services Planning Model,
George D. Weiner. 1978, 20p

Modifications to a stochastic model described by Navarro for health service planning are proposed. Defined components of the health care system are integrated by a finite Markov chain in the Navarro model. The size of the population served by the system is presumed to increase annually according to a specified rate. This appears to be an untenable assumption since new entrants into the system are not likely to have the same probability of entering a given health state as persons already in the system. The problem can be resolved by creating a quasistate with an unlimited supply of new entrants to the system. The incorporation of two quasistates (remain in the system or exit to another state) makes it possible to derive equations that relate expected state sizes at successive points in time for an expanding population. The Navarro model reflects the beliefs that population growth or decay is due to individuals leaving and entering the system and that state-specific probabilities are related to both events. A shortcoming, however, is the need to incorporate age changes in a population. With the passage of a unit period of time, two transitions are possible to include the age variable: transition between health service states; and transition from one defined age class to another. Equations and references are included.

HRP-0026965/4 PC **A08**/MF **A01**
Saskatchewan Univ., Saskatoon. Hospital Systems Study Group.
The Development, Implementation, and Evaluation of a Workload Index for Holy Family Hospital, Prince Albert, Saskatchewan,
P. Giovannetti, L. McKague, and P. Bicknell. Mar 73, 173p

The utilization of a nursing workload index at a hospital in Saskatchewan, Canada is described. Major topics discussed include nursing time spent in direct and indirect care; profiles of staffing in the medical, surgical, and obstetrical wards; the adjustment of nursing staff on a daily basis to meet workload fluctuations; and maintenance of a flexible staffing policy in order to ensure optimum patient care. Data are also analyzed that encompass the various nursing shifts, the type of nursing activities by categories of care, and the percentage of nursing time spent on and off the ward. Three manuals covering patient classifications and direct and indirect care, as well as a workload index graph, are appended. Fourteen tables and forty figures and an addendum comparing results for Holy Family Hospital to results obtained from a previous study in another hospital are also provided. The study recommends continued staffing, daily classification of patients to predict staff requirements for the next day, and periodic review of the workload index to provide necessary modifications.

HRP-0027554/5 PC **A11**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Wisconsin Health Status Survey (1977). Volume II: Estimates and Estimating Procedures.
13 Jul 78, 244p
See also Volume 1, HRP-0027553.

The second volume of the 1977 Wisconsin Health Status Survey containing estimates and estimating procedures is presented by the Southeastern Health Systems Agency (HSA) to provide health planners with population-based data and a model for health status measurement projects. The need for local statistics on such factors as acute illnesses, chronic conditions, and utilization of health delivery systems can either be met by applying national rates to local areas or by basing estimates on sample data from health status surveys. Survey data derives from telephone interviews and supplemental personal interviews with 26,256 individuals in Wisconsin. Data management seeks to restructure and reduce files for the study of cause/effect relationships on one hand and for planning and review of supply/demand relationships on the other. Limitations arise from the elimination of estimates below 400, from the distribution of sample results among age/sex cohorts, from the nonadditivity of small estimates, from the lack of strict comparability of the survey statistics with those from the National Health Interview Survey, and from the use of 1975 rather than current population data estimates. A bibliography and several tables and appendices are provided.

HRP-0027558/6 PC **A03**/MF **A01**
Health Careers of Ohio, Columbus.
Health Personnel Needs in Ohio.
Sep 78, 37p

The health personnel needs in Ohio for the six most difficult to fill allied health and nursing positions are reported in a 1978 study Military Experience Directed into Health Careers (MEDIHC) Project. The data was derived from a mail and telephone survey of 120 hospital facilities; statistical computation involved three different methods. Since the survey, the MEDIHC placement service has been used by 10% of the hospitals to remedy manpower shortages. The six overall hardest-to-fill allied health professional positions identified are medical technologist, respiratory therapist, radiologic technologist, physical therapist, occupational therapist, and medical records administrator; the six comparable nursing positions are medical technologist, registered nurse, respiratory therapist, radiologic technologist, physical therapist, and occupational therapist. Comparison between hospital responses in 1977 and 1978 indicated that the

needs over a period of 2 years remained constant. Included are synopses of total response, hospital response, bed count response, and 'other' response, as well as tables of hospital and 'other area' usage of service, and other information. Six appendixes contain the study instrument, a list of the 1978 Health Careers of Ohio, Inc., Board of Trustees, the program advertising brochure, the employer job listing form, a copy of manpower placement PROFILES, and the 1978 Expanded MEDIHC Effort report.

HRP-0028008/1 PC **A02/MF A01**
Missouri Div. of Insurance, Jefferson City.
Consumer Guide for Health Insurance.
Sep 78, 20p
Prepared in cooperation with Missouri State Dept. of Social Services, Jefferson City. State Health Planning and Development Agency.

This brochure for consumers describes, in plain language, the major types of insurance coverage available and what kinds of costs each pays for. It also explains how to determine how much coverage one needs and the major health insurance plans, such as group, individual, Medicare/Medicaid, and Blue Cross and Blue Shield. In addition, it presents questions to ask in evaluating one's present policy or appraising a new policy, a glossary of important insurance terms, and a list of offices to contact in Missouri for additional information. The types of insurance coverage discussed are basic hospital protection, major medical coverage, disability income insurance, catastrophic illness coverage, in-hospital income plans, dread disease policies, and Medicare supplements. A chart shows the 1978 average daily hospital room rates in Missouri in each regional planning area. Although published by the State of Missouri, the brochure contains much information that may be useful to those outside the State.

HRP-0028553/6 PC **A03/MF A01**
Pacific Consultants, Los Angeles, CA.
State Practices for Recovery of Third Party Resources in the Medicaid Program.
17 Mar 77, 44p
Contract SRS-500-76-0523

The purposes of this manual are to describe the basic principles for effective third party liability recovery and to illustrate some of the ways in which various States are implementing such principles. Some States have recovered as much as 40 percent of the total cost of hospital services by application of all Medicare and conventional health insurance benefits to which recipients are entitled. The most significant third party resources available to offset costs of care include: Medicare Parts A and B; basic hospital medical insurance coverage; automobile accident policies and other public liability policies; coverage available to members of health maintenance organizations; workmen's Compensation; veterans' benefits; estates of deceased recipients; and CHAMPUS (Civilian Health and Medical Program of the Uniformed Services). The manual is divided into four common elements of third party liability investigation and recovery: information sources and procedures; collection and recovery procedures; reporting and accounting provisions; and audit and control considerations.

HRP-0028703/7 PC **A15/MF A01**
Pennsylvania Univ., Philadelphia. School of Nursing.
Proceedings of the Eastern Conference on Nursing Research (2nd) Held at Philadelphia, Pennsylvania, on April 28-30, 1976,
Barbara Jacobsen, and Barbara Lowery. Jan 77, 338p

The proceedings of the Second Eastern Conference on Nursing Research, held in 1976 and sponsored by the University of Pennsylvania School of Nursing, are presented. The conference participants included nurses and nursing graduate students. A historical perspective on nursing research, including a content analysis of nursing research during various time periods, is provided. The factors influencing the participation of nurses in nursing research are examined. Distinctions between applied and basic research in nursing are analyzed. The research papers read at the conference addressed the following issues: catheter line infection, infant feeding practices, perceptions of accountability among nurses, primary nursing, a patient education program for cardiac rehabilitation, nursing students' role conceptions, correlates of compliance in preventive health behavior, attitudes of nursing students toward dying children, correlates of hospital stress, the cost effectiveness of a system for the delivery of nursing care, psychophysiological aspects of infant positioning, and the competence of nursing graduates in technical, communicative, and administrative skills. The research reports include tabular data and measurement instruments.

HRP-0028717/7 PC **A02/MF A01**
San Francisco Home Health Service, CA.
Formulation of a National Policy for In-Home Health and Supportive Services,
Hadley Dale Hall, Joyce A. Tufts, and Katherine Ricker-Smith. 2 Nov 77, 20p
Presented before the American Public Health Association, November 2, 1977, Washington, DC.

Major policy issues, problems, and recommendations concerning the provision of in-home health services are discussed. Other areas covered include background information, a description of such services, and an estimation of the potential demand for in-home services. These services can play a vital role during a health crisis, in preventing a crisis, in shortening institutional stay, and in serving the chronically ill and disabled for whom institutionalization is not medically necessary. According to a Congressional Budget Office estimate, by 1985 between 3.5 and 5.2 million adults could effectively utilize in-home health services. However, further research is needed to accurately assess potential utilization. Major policy issues include coordination in the areas of patient assessments and monitoring, integration of health and social services, and coordination among public financing programs; the development and implementation of quality criteria; and the elimination of fraudulent profit. Research should be conducted in estimating and locating populations in need of in-home services, current programs and payment mechanisms, and outcome evaluation research. Successful implementation of a well-integrated in-home health system would enable the chronically ill and disabled to achieve their optimum quality of life.

HRP-0029144/3 PC **A05/MF A01**
Orkand Corp., Silver Spring, MD.
Analysis of Existing Review Processes and Proposed Appropriateness Review Processes for HSAs. Report 'D'.
1 Apr 76, 77p
Contract PHA-HRA-230-75-0110

Progress in developing model appropriateness review procedures for State health planning and development agencies (SHPDA's) and health system agencies (HSA's) is reviewed. The steps to be taken by HSA's in appropriateness reviews are outlined. Criteria for determining the strengths and weaknesses of each review process are discussed. A form developed for analyzing existing review procedures in relation to the evaluation criteria is included. Review processes are ranked in terms of their value in formulating processes of model appropriateness review. Two model appropriate review processes are presented which were developed for utilization by HSA's. The methodology utilized in the continuing development of the processes is explored. A description of each step in the two proposed appropriateness review processes is included. Comments concerning the conduct of each step and the order of the steps are provided. The steps of the proposed appropriateness review processes are divided into the following phases: prereview; conduct of the review; and postdisposition. The future development of appropriateness review processes is considered. Exhibits illustrate the material presented.

HRP-0029146/8 PC **A06/MF A01**
Hohenstein (C. L.) and Associates, Atlanta, GA.
I and R (Information and Referral) Program Configuration: A Guide for Statewide Planning,
C. L. Hohenstein, and J. Banks. Oct 75, 125p
DHEW/PUB/OHD-76-20114
Sponsored in part by South Carolina Commission on Aging, Columbia.

The guide is designed to help States and other jurisdictions determine which information and referral services will best meet the needs of their older population. The major factors in the development of an information and referral program are the population to be served, staff service capacity, evaluation considerations, the geographic area, volunteer service involvement, and projected budget and unit cost per service request. Results are presented of a study of onsite visits to 20 information and referral facilities throughout the United States. A method for determining the client population and the geographic areas of coverage is described. The efficiency of separate systems for older people as opposed to the efficiency of generic systems for the entire population is considered. Advantages and disadvantages of single statewide, statewide decentralized, and local systems are noted. An example application of analysis methods is presented. Figures and tables highlight the information.

HRP-0029316/7 PC **A04/MF A01**
New Hampshire Dept. of Health and Welfare, Concord. Bureau of Vital Records and Health Statistics.
Vital Statistics Report for the State of New Hampshire, 1978.
1979, 64p

A statistical summary of vital events in New Hampshire during 1978 is presented. Factors taken into account in the compilation of statistics are the underregistration of events, the geographic allocation of events based on residence or place of occurrence, fetal deaths based only on conceptions that passed through 20 weeks of gestation, limitations in interpreting changes in cause of death statistics (changes in nomenclature and the classification scheme that may affect the comparability of statistics over time), and data limitations (need for caution in making specific inferences based on comparisons of statistics for different areas or for different periods of time). Terms used in the statistical report are defined. Summary statistics are given, along with data on demography, natality, fetal mortality, neonatal mortality, infant mortality, induced termination of pregnancy, mortality in general, and marriage and divorce. An address where additional information can be obtained is given. An index is included.

HRP-0029318/3 PC **A12/MF A01**
Alpha Center for Health Planning, Bethesda, MD.
Hospital and Long Term Care Facility Capital Expenditures Analysis.
c26 Feb 79, 273p
See also HRP-0029317/5.

The presentations and reference materials contained herein include papers on analyzing financial statements, a case study on the financial viability of hospitals in Baxter County, N.Y., a financial feasibility review, a discussion of alternative sources of debt financing, and excerpts from a bond issue's official statement by the New Jersey Health Care Facilities Financing Authority. The analysis of financial statements is a discussion of how to compute and interpret 20 different kinds of financial ratios grouped into liquidity ratios, capital structure ratios, activity ratios, and profitability ratios. The discussion of alternative sources of debt financing describes a new program by Blyth Eastman Dillon Health Care Funding, Inc. The program combines the Federal Housing Administration Insured Mortgage Loan Program and the Government National Mortgage Association guarantee with the issuance of tax-exempt revenue bonds. The discussion of financial feasibility review is a discussion of a new conceptual approach to the review of financial feasibility as a generic problem for comprehensive health planning. The approach is intended to provide a basis for financial feasibility judgments.

HRP-0029393/6 PC **A05/MF A01**
Ohio Dept., of Health, Columbus.
Cost Analysis of Ohio Nursing Homes.
Final rept.,
Robert Caswell, and William O. Cleverley. 1976, 94p

The primary purpose of this study was to analyze and discuss major policy issues in the nursing home industry; a secondary purpose was to clean and document errors in Medicaid cost data as recorded in the research project on a computer tape

that will be used in future studies. The major policy issues that were analyzed were the optimal size of nursing homes (economies of scale), the impact of control status on measures of efficiency and cost, uniformity of current accounting systems for nursing homes and their relationship to reimbursement, the impact of Medicaid utilization upon nursing home provider cost behavior, the relationship of occupancy and cost with special attention to the current 85 percent level used in the Medicaid reimbursement formula, the cost-effectiveness of transferring Medicaid patients from skilled nursing facilities (SNF's) to intermediate care facilities (ICF's), and licensure requirements. No economies of scale were discovered for total nursing home costs, although some economies were discovered for direct costs. Proprietary nursing homes were more efficient (less costly) than either voluntary or government homes. Transferring patients from SNF's to ICF's would save substantial costs.

HRP-0029437/1 PC **A02**/MF **A01**
Harvard Center for Community Health and Medical Care, Boston, MA. Program on Health Care Policy.
Effects of Coinsurance on the Use of Physician Services: Comment,
Harold S. Luft. Jun 73, 11p DISCUSSION PAPER-9

The characteristics of a medical plan population may significantly affect their rate of physician utilization. This theses was used in this critique of a study focusing on the impact of coinsurance on physician utilization at a Palto Alto comprehensive prepaid medical plan. The original study's contention that a 25 percent coinsurance rate caused a 24 percent drop in the per capita physician visit rate is thrown into doubt when problems with the sample and interpretations of utilization patterns are considered. One sample problem is that the study population was limited to Stanford plan members covered for the full 12 months of both 1966 and 1968. 'Aging' of the sample (or the exclusion of persons who were new members in 1968) could have contributed to the drop in utilization, since new members are encouraged to have initial examinations. Another factor influencing utilization is that minor complaints may be brought up during the initial exam which would not warrant special attention at other times. That would account for the greater reduction in minor complaints than other illnesses noted in the original study. Further research is needed to determine the true impact of coinsurance.

HRP-0029498/3 PC **A15**/MF **A01**
Texas Univ. Health Science Center at Houston. School of Public Health.
The Provision of Training to Health Planning Participants.
Final rept.
Nov 76, 331p
Contract PHS-HRA-106-74-29

Thirty short-term training sessions related to comprehensive health planning agency performance were conducted by the University of Texas School of Public Health. Sessions were held over a 2-year period from June 1974 to November 1976. Performance standards for State and areawide comprehensive health planning agencies specified in the National Health Planning and Resources Development Act (Public Law 93-641) served as the functional basis of training. These standards concern health plan development and implementation, the conduct of studies, public issue involvement, project review, agency management, community participation and education, planning coordination, data management, and areawide development and assistance. The overall training project was analyzed with respect to the usefulness of each training session to health planning participants, the identification of training needs not met by the project, and suggestions for meeting the needs of health planning participants through short-term training sessions. The following specific topics under this area were identified as being important: development of health systems plans; development of annual implementation plans; and health systems agency review standards and criteria, review responsibilities, and work programs. Training needs that were not met within the scope of project activities concerned specificity in training sessions, the training of agency governing body members, and cost containment, as well as others. Additional project information and participant evaluation forms are appended.

HRP-0029606/1 PC **A07**/MF **A01**
Harvard Center for Community Health and Medical Care, Boston, MA.
Emergency Medical Services in the City of Boston,
Joel C. Kleinman, Robert J. Weiss, Marsha M. Tanner, Donna L. Soodalter, and Jeffrey A. Cutler. Dec 72, 133p
Grant PHS-5-P16-HS-00472
Prepared in cooperation with Peter Bent Brigham Hospital, Boston, MA. Sponsored in part by Tri-State Regional Medical Program, Boston, MA.

The data collected for use in planning an emergency medical system for Boston are presented. The need for cooperative planning among the city's hospitals, neighborhood health centers, and transportation and communication facilities is stressed. The capabilities of the eleven emergency rooms which were visited during the course of the study are discussed. The variation among hospitals in the proportions of emergency and nonurgent patients is examined. Patients tended to use facilities near their homes. The need for the various levels of services to be planned on a geographic basis is emphasized. Age and sex are shown to be important determinants in the utilization of Boston's emergency rooms. Descriptions are provided of the three ambulance services which provided transportation for 13 percent of the city's emergency cases. Studies are urged to determine whether or not the 87 percent of emergency cases who relied on their own transportation arrived at the hospital faster than those patients who came by ambulance. Appendixes provide information on methodological details; the emergency service of East Boston neighborhood health center; and the police districting plan. Numerous tables are included.

HRP-0029687/1 PC **A03**/MF **A01**
Harvard Center for Community Health and Medical Care, Boston, MA.
Analysis of 1974 Proposed Rate Setting Regulations for Long Term Care Facilities,
Christine E. Bishop. 24 Jan 74, 35p

The potential impact of 1974 regulations that propose new calculations of cost ceilings and higher occupancy standards for nursing homes are discussed. Data were taken from audited cost reports of Massachusetts nursing and rest homes for 1971. The proposed regulations focus on methods for calculating reimbursements to institutions for patients receiving public assistance. A ceiling of one standard deviation was proposed for variable costs for each group of homes, which were classified according to the level of care provided patients. An analysis of the data revealed that the proposed cost ceilings would have produced little impact on facilities in 1971. Since fewer than one-eighth of the homes from any level exceeded the proposed ceiling, few costs would have been disallowed. The regulations also proposed a 95-percent occupancy rate, which would decrease reimbursement rates for all homes achieving less than 95-percent occupancy. Thirty percent of the homes studied would have been affected by this regulation. Appended materials discuss calculation of standard deviations.

HRP-0029801/8 PC **A03**/MF **A01**
Boston Univ., MA. Center for Health Planning.
Review of Mental Health Components of Health Systems Plans,
Tama Silverstein. 1979, 37p
Contract PHS-HRA-230-76-0078

This review of mental health components in health systems plans (HSP's), with each component organized by problem identification and problem solution categories, is intended to provide New England mental health planners with information on what other health systems agencies have identified as problems and issues in mental health. Six aspects of mental health care are reviewed, as reflected in various HSP's as of 1978: (1) acute care (adult inpatient services, general acute care problems regarding special populations--children, adolescents, and the elderly, hospital costs, health care resources, availability, accessibility, continuity, and quality); (2) postacute long-term care (special populations in need of long-term care--adolescents, children, and the elderly, availability, and facility and fiscal resources); (3) ambulatory care; (4) prevention, consultation, and education (availability of community-based services, percentage of time that full-time direct care staff spend in program-oriented consultation and public education, and resources for educational programs); (5) multicharacteristic scale of measurement for mental health system performance (deinstitutionalization, community-based service through residential alternatives, and types of mental health services); and (6) interagency coordination. Footnotes (HSP's and HSP references) are included.

HRP-0029802/6 PC **A02**/MF **A01**
Boston Univ., MA. Center for Health Planning.
Some Suggestions for Cost Containment in Plans of Health System Agencies,
Donald S. Shepard. Aug 78, 15p

The mandate of health systems agencies (HSA's) to control health care costs is discussed, and suggestions to facilitate cost containment are offered. Major cost savings have not been demonstrated by certificate-of-need programs, rate setting systems, utilization review, and programmatic changes in health care financing and delivery systems. Four selected strategies for cost containment are controls on the supply of health facilities, controls on the supply of physicians, reductions in the amount of medical care provided, and incentives. Reimbursement pressures are generally the most powerful source of control over health facility supply. HSA's should limit their efforts to proposed new facilities where potential savings may be greater and where political opposition may be less severe than in the case of existing facilities. A major strategy in controlling medical care expenditures is to reduce the amount of medical care provided. The policy issue in this strategy is to identify medical interventions that can be safely eliminated. Utilization review can aid in determining the need for medical or surgical intervention. Consumers can be given incentives to use services more prudently and efficiently, and sharing costs and savings with consumers can serve to increase their interest in changing health habits and their use of health services. References are cited.

HRP-0029803/4 PC **A02**/MF **A01**
Boston Univ., MA. Center for Health Planning.
A Summary of the National Guidelines for Health Planning.
1979, 25p
Contract PHS-HRA-232-78-0108

Requirements stipulated in the National Health Planning and Resources Development Act of 1974 (Public Law 93-641) concerning the formulation and issuance of guidelines are outlined. The act requires that guidelines include standards regarding the appropriate supply, distribution, and organization of health care resources and a statement of national health planning goals expressed in quantitative terms to the extent practicable. Purposes of guidelines are to clarify and coordinate national health policies and to assist health systems agencies in the development of health systems plans. Guidelines issued in 1978 focus on cost containment and quality enhancement in the institutional sector and identify nine specific categories of health services and facilities: (1) general hospitals with standards for bed supply and occupancy rate; (2) obstetrical inpatient services; (3) neonatal special care units; (4) pediatric inpatient services with standards for the number of beds and occupancy rate; (5) open heart surgery; (6) cardiac catherization; (7) radiation therapy; (8) computed tomographic scanners; and (9) end-stage renal disease. The primary means of implementing guidelines is through local health systems agencies and their health systems plans. The guidelines are included, along with comments on categories of health services and facilities.

HRP-0029832/3 PC **A04**/MF **A01**
Georgia Inst. of Tech., Atlanta. Health Systems Research Center.
A Study of Methods Used in Planning Psychiatric Bed Needs,
Kenneth E. Burns. Aug 78, 57p

Planning methods used by health systems agencies (HSA's) to determine the number of psychiat-

ric hospital beds needed to serve community needs were investigated. A questionnaire was administered by mail to 200 HSA mental health planners in the United States. A total of 110 responses were returned, but only 103 arrived in time to be evaluated. The approaches identified by the respondents included key informant, fixed ratio, utilization, and social indicator. A majority of respondents indicated that their approach was unspecified. Each method is defined and their advantages and disadvantages enumerated. It is concluded that the methods used are inadequate for planning community needs for psychiatric beds. Planning methods based upon medical utilization models cannot reliably be applied to mental health needs. It has been estimated that 15 percent of the population needs some form of mental health services, and that each age and sex group has unique types of mental health needs. The subjective nature of mental health problems and the underreporting of mental illness contribute to the difficulty in planning psychiatric services. The population's mental health needs are believed to be unserved, underserved, or inappropriately served. A sample of the survey instrument sent to the health planners is included. The survey respondents are listed according to State and service area. The needs and planning methodologies for each respondent are listed.

HRP-0029858/8 PC **A02/MF A01**
Boston Univ., MA. Center for Health Planning.
Checklist: Issues/Concepts in Mental Health for Health Systems Plans.
Richard D. Sorenson. 1979, 9p
Sponsored in part by Bureau of Health Planning and Resources Development, Hyattsville, MD.

Concepts in mental health that are relevant to health planning are listed to aid health systems plan (HSP) development with regard to the identification of issues. The purpose of the checklist is to help define appropriate activities for health systems agencies (HSA's) involved in mental health. The checklist covers mental health, mental illness, deinstitutionalization, community mental health centers and other service linkage concepts, the promotion of mental health and the prevention of mental illness, and linkages between mental health and other elements of HSP's. Deinstitutionalization requires retraining and relocating institutional manpower as institutions decrease their services and/or redefine their goals and may result in additional manpower for community services that replace State-operated services. The specific impact of deinstitutionalization must be analyzed by HSA's. HSA's must present and analyze data on admissions and readmissions to institutions to ascertain patterns, diagnoses to identify differences, referrals in and referrals out, census trends in institutions, and utilization. In incorporating the promotion of mental health in HSP's, consideration must be given to providing support for persons in times of stress where coping is difficult. Concepts deinstitutionalization and community service networks are pertinent to postacute care, mental retardation, substance abuse, acute care, and special population groups (e.g., battered spouses and the elderly).

HRP-0030061/6 PC **A02/MF A01**
PACT Health Planning Center, Denver, CO.
Bed Requirements Methods and Processes.
Technical assistance memo,
Paul R. Justison. 1 Feb 79, 7p

The major differences between two basic types of models for determining hospital bed requirements are discussed. These methods include the Hill-Burton group, stochastic methods, normative approaches and processes like that developed by the Georgia Office of Comprehensive Health Planning. Methods are characterized as somewhat inflexible, with underlying assumptions left implicit; whereas processes usually incorporate more than one method, possess more flexibility, and include explicit health policymaking. Brief descriptions of methodic planning approaches encompass adjustments to Hill-Burton calculations, the Normile stochastic method, and the national health planning guideline standard of four beds per 1,000 population. The Georgia process model for assessing the local rate of hospital bed utilization and determining the number of beds needed is also described. The importance of recognizing the assumptions inherent in any approach to hospital bed calculations before utilizing that approach is underscored.

HRP-0030255/4 PC **A03/MF A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Study of Purchasing and Materials Management Functions in Private Hospitals. Opportunities for Improving Hospital Purchasing, Inventory Management and Supply Distribution, Part I.
Apr 79, 41p PSAD-79-58A
See also Part 2, HRP-0030256.

Methods on how hospitals can control their costs by central purchasing and centralized inventory management and supply distribution are suggested. Three areas in particular--pharmaceutical costs, costs of food supplies, and costs of contractual services--are discussed. Central purchasing helps to control costs by planning and scheduling purchases, inviting competitive bidding, using group purchasing agreements with other hospitals, and using a value analysis and standardization of purchases throughout the hospital. Centralized inventory control allows quantitative techniques to facilitate inventory management; it also applies to control and monitoring of linen uses and internal controls over items to be charged separately to patients. The cost of pharmaceuticals, food supplies, and contractual services (food service, laundry service, housekeeping service, and maintenance services) can be reduced by designating a central authority for purchasing and monitoring, by inviting competitive bidding, by participating in group purchasing agreements where feasible, and by imposing internal controls. These conclusions are based on surveys of 21 hospitals in Illinois, Indiana, and Wisconsin. Part II, a separate document, contains a management-oriented checklist and audit steps for better materials management.

HRP-0030256/2 PC **A04/MF A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Checklist and Guidelines for Evaluating Purchasing and Materials Management Functions in Private Hospitals. Opportunities for Improving Hospital Purchasing, Inventory Management and Supply Distribution, Part II.
Apr 79, 59p PSAD-79-58B
See also Part 1, HRP-0030255.

A checklist and specific auditing steps on improving materials management in private hospitals are provided. The checklist is 32 pages long and covers authority and responsibility, purchasing, inventory management, supply distribution (medical surgical supplies), pharmaceutical purchasing, pharmaceutical inventory management, food services, and audit and evaluation. The auditing steps are presented in detail for analyzing the performance of purchasing, procedures, policies, and practices; inventory management; medical-surgical supply distribution; linen distribution and control; and contracted services. The section on purchasing, procedures, policies, and practices is further broken down into the following categories: authority and responsibility, planning, purchasing, group purchasing, standardization, value analysis, competition, receiving, and capital equipment. The checklist and auditing steps are based on a survey of 21 hospitals in Illinois, Indiana, Wisconsin. Part I, a separate document, presents suggestions on how hospitals can improve their supply distribution, purchasing, and inventory management.

HRP-0030319/8 PC **A02/MF A01**
Southeastern Association of Health Systems Agency Executives.
Southeastern Health Systems Agencies Take Initiative in Maintaining Governing Body Broad Representation in Officer Positions.
Progress rept. no. 3.
10 Apr 79, 12p

The commitment of health systems agencies (HSA's) in the southeastern part of the United States to the philosophy of broad representativeness on their governing bodies is examined. Since 1976, more than half of HSA governing body members serving in officer positions in the area have been consumers. Of 80 governing body provider members serving as HSA officers, the largest group is comprised of physicians. Thirteen hospital administrators serve as HSA officers, along with nine registered nurses and seven dentists. Other health care provider officers come from many disciplines, such as physical therapy, psychology, health insurance, employee health benefits, professional standards review organizations, and hospital planning. A larger percentage of HSA officers are from standard metropolitan statistical areas than from outside these areas. Even though the HSA's have underscored their commitment to broad representativeness, the small number of officer positions in individual HSA's makes it impossible to assure representation of every demographic sector in the officer group at any one point in time. Tables list occupational titles of consumer governing body members and memberships in organizations and associations as indicated by HSA officers.

HRP-0030359/4 PC **A02/MF A01**
Bureau of Health Manpower, Hyattsville, MD. Div. of Manpower Analysis.
Foreign Dental Graduates in the United States.
Dec 78, 18p DHEW/PUB/HRA-79-24

Foreign dental graduates enter the United States through two principal pathways: (1) as immigrants-aliens admitted for permanent residence, and (2) as nonimmigrants-aliens who come to the United States for temporary periods of time, primarily as exchange visitors. In considering the significance of FDG's, this report is concerned mainly with those FDG's who are immigrants. The purpose of this report is to bring together some of the limited information available on the subject of FDG's in the hope that it will be a a helpful contribution and perhaps will also stimulate further study.

HRP-0030407/1 PC **A10/MF A01**
Miller and Byrne, Inc., Washington, DC.
Feasibility of Using Program Recipients to Evaluate Selected PHS Programs.
Final rept.
15 Jan 79, 222p
Contract PHS-HRA-230-77-0132

The National Public Health Service Corps Scholarship Program and the National Health Planning Information Center Program were selected to form the basis of a study on the feasibility of using program recipients to evaluate Public Health Service programs. The study concluded that, while recipient evaluations are feasible, certain practical considerations should be considered. For example, individual recipient evaluations are more feasible than institutional recipient evaluations; program recipients and program managers tend to have different evaluation agendas; program recipients are interested in legislative and policy issues whereas program managers are interested in managerial issues; program recipients tend to develop a greater sense of program awareness and become politicized during the course of an evaluation; program managers tend to react defensively to recipient evaluations; and program recipients tend to become frustrated and alienated when program managers do not respond favorably to the results of recipient evaluations. The areas where recipient evaluations are most beneficial and least costly are evaluation planning and design and data analysis and interpretation.

HRP-0030445/1 PC **A04/MF A01**
Bureau of Health Planning and Resources Development, Hyattsville, MD.
Users' Manual for the Health Systems Agency Reporting System.
Jul 77, 71p

Guidelines are presented in this user's manual to aid in implementing the health systems agency reporting system (HSARS) mandated by the National Health Planning and Resources Development Act of 1974 (Public Law 93-641). The health systems agency (HSA) review and development program involves self-assessment and reporting, Federal review, and development of corrective actions. The self-assessment and reporting element of the program is to be achieved through use of the HSARS, a standardized information collection mechanism. HSAR includes (1) information about characteristics of HSA organizational components (i.e., governing body, staff, committees, and subarea advisory councils); (2) HSA work program for accomplishing objectives; (3) information on the nature and conduct of selected HSA activities requiring the maintenance of special documentation records; and (4) information on the allocation and

expenditure of resources required to accomplish the HSA work program. At the end of each grant year, HSA's must submit an annual baseline report and quarterly reports dealing with data revisions, HSA work program achievement and resource utilization, and records of selected HSA activities. The user's manual contains individual data collection instruments (forms) embodied in the HSARS and provides instructions to HSA's to aid in completing and submitting HSARS reports. The forms are organized according to HSA structure and organization, work program, selected activity records, and resources.

HRP-0030600/1 PC **A03**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
A Reassessment of the Effectiveness of NECHEN (New England Council on Higher Education for Nursing).
1974, 38p
Materials from a conference held at Worcester, Massachusetts on April 23, 1974.

The proceedings of a conference session on the reassessment of the effectiveness of the New England Council on Higher Education for Nursing (NECHEN) are presented. Included are introductory comments, a summary of a four-person panel discussion, questions for group discussion, reports from 10 discussion groups, and a roster of conference attendees. Options regarding representation of NECHEN, interest groups, and the executive and advisory committees are listed. Among the structural changes suggested for NECHEN are longer continuous appointments, replacement of interest groups with task forces, dissolution of the advisory group, and changing the executive committee membership composition. Topics for the discussion groups included: overall effectiveness and functioning of NECHEN; representation ot NECHEN; functions of interest groups and the executive committee; program development; and communications. Suggestions were made regarding the need to: develop specific goals for NECHEN, involve students in NECHEN, widen the membership, and involve agencies other than educational institutions. The discussion groups perceived NECHEN as either a forum for information exchanges or as an organization that should be oriented toward action.

HRP-0030605/0 PC **A03**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Nursing's Role in the Improvement of Health Services.
1976, 35p
Papers presented at a conference held at Worcester, MA on April 8-9, 1976.

Papers read at a 1976 conference on the role of nursing in the improvement of health services are presented. Sponsored by the New England Council on Higher Education in Nursing, the conference was attended by representatives of educational institutions, State departments of health education, the Federal Government, and nursing associations. Conference activities and schedules are listed. Summaries of panel presentations and reports are presented. The topics discussed included new roles for nurses in the delivery of health services and the national project on analysis and planning for improved distribution of nursing personnel and services. New roles considered for nurses centered on: infant and child assessment and management, screening and referral of the elderly, nurse clinician practice, and continuing visiting nurse care for long-term patients. The activities of the national nursing distribution project include: development of nurse manpower models; innovative approaches to distribution; national conferences and regional workshops; and short-term training courses.

HRP-0030606/8 PC **A04**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Extended Roles for Nurses.
1973, 53p
Papers presented at a conference Held at Wakefield, MA on April 3, 1973.

Papers from a 1973 conference on extended roles for nurses are presented. The conference was sponsored by the New England Council on Higher Education for Nursing, and was attended by representatives of educational institutions, nursing service associations, State departments of education and health, and the Federal Government. Nursing practice in emerging health care systems is discussed. New England programs that prepare nurses for expanded roles include a clinical specialist program and a pediatric nurse associate program. Reports are presented on interest group discussions held for associate degree, baccalaureate degree, graduate, continuing education, and research groups. An overview is presented of health service delivery models in the United States, including new types of manpower models; the Livingston model; the Garfield model; the Meharry model; experimental health services delivery models; the Columbia and East Baltimore (MD.) models; and the San Joaquin Community Health Services delivery system.

HRP-0030607/6 PC **A03**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Impact of Professional and Political Developments on Nursing Education in New England.
1978, 50p
Papers presented at a conference held at Bedford, New Hampshire on April 20-21, 1978.

Papers from a 1978 conference on the impact of professional and political developments on nursing education in New England are presented. The schedule and activities of the conference are listed. Topics discussed include: the study of credentialing in nursing, health planning in New England and the implementation of Public Law 93-641, the professional nurse and politics, implications of health planning for nursing and nursing education in New England. Those attending included representatives of educational institutions, nursing associations, State departments of health and boards of education, and the Federal Government. The scope of the national credentialing study was described, and diagrams of credentialing mechanisms were provided. Legal, voluntary, and governmental mechanisms for credentialing of nursing service and education were noted. The development of health systems plans under Public Law 93-641 is expected to promote cost containment by focusing on disease prevention and increased primary care facilities. Nursing education should reflect these changing goals.

HRP-0030608/4 PC **A04**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Issues of Nursing Education in New England.
1977, 68p
Papers presented at a conference held at Enfield, CT on April 14-15, 1977.

Papers from a 1977 conference on nursing education issues in New England are presented. The conference was sponsored by the New England Council on Higher Education in Nursing. Participants were representatives of educational institutions, the Federal Government, State departments of health and education, and nursing associations. The conference schedule and activities are reported. Summaries of panel presentations include discussions on: educational advancement for nurses, the supply and distribution of nurses, role differentiation of nurses from different types of programs, and the future of diploma schools of nursing. Characteristics of New England that affect the planning for nursing education and the Southern Regional Education Board nursing curriculum project are described. The issues of continuing education, recognition of educational achievements, a quota system for regulating nursing school admissions, factors controlling the creation of new educational programs, and the phasing out and replacement of diploma school programs are discussed.

HRP-0030609/2 PC **A03**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Legal Aspects of Nursing Education and Students' Rights.
1978, 46p
Papers presented at a conference Held at Wakefield, MA on Oct 19-20, 1978.

Papers read at the 1978 conference on the legal aspects of nursing education and students' rights are presented. The conference was sponsored by the New England Council on Higher Education for Nursing and was attended by representatives of educational institutions, State departments of education and health, the Federal Government, and nursing associations. The conference schedule and activities are listed. Panel presentations are summarized. Topics discussed included: legal aspects of higher education and human rights; a description of a role-played admissions committee meeting; implications of section 504 of the Rehabilitation Act; and the implications of students' rights and due process for nursing education. Experiments involving students, the responsibilities of student counselors, the rights of students to be graded fairly, expulsion procedures, faculty liabilities, confidentiality, admissions policies, and specific cases of nursing students who did poorly in coursework were discussed. The rights of minority and handicapped students and applicants were examined.

HRP-0030610/0 PC **A04**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Planning for Nursing Education in New England: NECHEN's Role.
1977, 57p
Papers presented at a conference Held at Sturbridge, MA on Oct 27-28,1977.

Papers from a 1977 conference on the role of the New England Council on Higher Education for Nursing (NECHEN) in planning for nursing education in New England are presented. The schedule and activities of the conference are noted. Conference participants included representatives of educational institutions, nursing service associations, State departments of health and education, and the Federal Government. The presentations include an introduction to the conference; a review of 5 years of NECHEN activities and the implications for planning; a national perspective on planning for nursing; a summary of group discussion; Rhode Island's experience with nursing requirements and resources projection; and the activities of the New Hampshire statewide interdisciplinary planning project for nursing and nursing education. Group discussions focused upon what was perceived to be lacking in New England nursing education, the identification of specific problems, and the generation of specific suggestions for the role to be taken by NECHEN in the coordination of planning for nursing education.

HRP-0030618/3 PC **A03**/MF **A01**
New England Council on Higher Education for Nursing, Wellesley, MA.
Statewide Planning for Nursing Education.
1973, 38p
Papers presented at a conference held at Wakefield, MA on Oct 19, 1973.

On October 19, 1973 the New England Council on Higher Education for Nursing (NECHEN) sponsored a conference on statewide planning for higher education and for nursing education in New England states. Approximately 120 persons attended the conference including college and university representatives to NECHEN, other faculty members from NECHEN schools and representatives from nursing agencies and organizations in New England, federal nursing programs and the National League for Nursing.

HRP-0030731/4 PC **A03**/MF **A01**
California Univ., San Francisco. School of Medicine.
The California Relative Value Studies and Costs of Physician Office Visits (1969): Two Studies,
William J. Sobaski, Anne A. Scitovsky, and Nelda McCall. Apr 76, 32p
Prepared in cooperation with Social Security Administration, Washington, DC. Div. of Health Insurance Studies, and Palo Alto Medical Research Foundation, CA.

The rapid rise in medical care costs during the past two decades has been the subject of study by a number of economists, notably Klarman and Rice, Feldstein and Fuchs. They have attempted to isolate and quantify the major factors responsible for this rise, such as changes in demand, technology, and labor costs. An additional and more technical

factor has been explored recently in a study by the Social Security Administration, conducted by William J. Sobaski: the possible effect on physician costs of the system of recording claims for specific medical services rendered under government programs. A system of consistent and accurate recording of physician services under such programs is essential from all points of view: the government's, providers', and patients'. At the same time, such a system must be flexible enough to take account of new procedures and methods of treatment. This means that any recording system must be revised and updated from time to time. There is a danger, however, that such a revision may in itself result in a distortion of the recording of actual services rendered and become an additional factor in raising the costs of physician services.

HRP-0030747/0 PC **A03**/MF **A01**
Illinois Central Health Systems Agency, Inc., East Peoria.
Preliminary Analysis of the National Guidelines for Health Planning and Their Application to the ICHSA (Illinois Central Health Systems Agency) Health Service Area.
Feb 79, 28p
Grant PHS-05-P-000214-03-1

The Ntional Guidelines for Health Planning are analyzed here for their impact on the health service needs in the jurisdiction of the Illinois Central Health Systems Agency (ICHSA). The eleven guidelines considered are bed supply and occupancy rates of general hospitals, obstetrical services, neonatal special care units, number of beds and occupancy rates for pediatric inpatient services, open heart surgery, cardiac catheterization, radiation therapy, computed tomographic (CT) scanners, and end stage renal disease. When the national standards are applied to the ICHSA planning area, the area is seen to have an excess bed supply. The occupancy rate for medical/surgical beds in 1977 in the ICHSA area was 71.1 percent, 8.9 percentage points below the standard; 45.3 percent for pediatric units, 29.7 percentage points below the standard; 47.2 percent for obstetrical units, 27.8 percentage points below the standard; and 49.4 percent for intensive care units, 10.6 percentage points below the standard. The guidelines would allow one additional radiation therapy unit in the area. Neither of the two CT scanners are being used to the capacity specified in the national guidelines. Despite that, however, a third scanner is on order.

HRP-0030837/9 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
The Role of Health Economics in National Health Planning and Policy-Making.
1978, 37p ICP/HSD-039
Report on a Working Group, Held at Cologne (Germany, F.R.) on June 7-10, 1977.

Growing concern in European countries about the rising cost of health care is discussed in this report by a working group of the World Health Organization. The working group focused on the following points believed to be relevant to health economics: rising health care costs represent a matter of concern in health planning and also a major impetus to it; since health care and health planning structures seem to be programmed toward growth, the climate of little or negative growth in national economies makes the situation more problematic; short-term cost containment measures are not adequate; and health planning processes geared primarily toward meeting health and social needs of the population served are less biased toward increasing expenditures than processes focused mainly on the development of health institutions and health resources. Health care costs are examined in relation to the lack of comparability and comprehensiveness of definitions of health care spending, the reasons for the increase in health care costs, reasons for concern about rising health care costs, and measures to limit rising health care costs. The role of health economics and its information requirements is considered in terms of health policy, plan execution, and evaluation of policy implementation. Arrangements for health economics are discussed with reference made to sources of advice and increasing capability in health economics.

HRP-0030838/7 PC **A05**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Cost/Benefit Analysis in Mental Health Services.
1976, 79p ICP/MNH-006-II
Report on a Working Group, held at The Hague (Netherlands) on June 21-25, 1976.

This working group was organized by the World Health Organization's Regional Office for Europe to discuss cost-benefit analysis in the mental health field in relation to different patient groups, types of mental health services, and administrative-organizational levels. The specific goal of the working group was to outline proposals for cost-effectiveness studies in mental health services, to be tested in pilot study areas of Europe. Working group participants determined that the cost-benefit approach in the health field is an important decisionmaking technique and that cost-effectiveness analysis has advantages over traditional cost-benefit analysis in terms of the importance of including benefits not measurable in monetary units. Most countries in Europe reported having conducted studies in the mental health field using the cost-benefit approach, although France was the only country where an overall analytical approach was being developed in the context of a cost-benefit framework. Because the cost-benefit approach in the mental health field is in its initial stage in nearly all European countries, the need for disseminating information on appropriate study methodologies and results is emphasized. Models for cost-benefit analysis are discussed, and additional information on application of the technique is provided in report annexes.

HRP-0030849/4 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Public Health Aspects of Antibiotic-Resistant Bacteria in the Environment. Report on a Consultation Meeting Held at Brussels, Belgium on December 9-12, 1975.
1976, 27p

As part of its long-term program of environmental pollution control and hospital infection control, the World Health Organization's Regional Office for Europe held a consultation on public health aspects of antibiotic-resistant bacteria in the environment. The primary purpose of the consultation was to consider the development of epidemiological surveillance and ecological studies or resistant bacteria. A considerable amount of attention was given to the predominance of infection by drug-resistant bacteria in specialized hospital units, including urological and pediactric units, burn and organ transplantation units, and units for the intensive care of neurosurgical patients. The following solutions proposed to control hospital infections were reviewed: prophylactic use of antibiotics, treatment of infections with combinations of antibiotics, and prevention of the spread of resistant organisms by effectively applying strict hygiene rules. Microbiological, genetic, veterinary, ecological, and administrative aspects of bacteria resistant to antibiotics were analyzed, as well as the surveillance of bacterial resistance. The need for more precise information on how bacteria growth is promoted by using antibiotics as feed additives and on chemical, biological, and physical factors that may affect the presence of bacteria in the environment was emphasized. Recommendations pertinent to the control of environmental pollution and hospital infections are offered. A bibliography is appended.

HRP-0030851/0 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Randomized Trials in Preventive Medicine and Health Service Research.
1976, 33p ICP/SHS-006(9)
Report on a Study Group, Held at Copenhagen (Denmark) on December 8-12, 1975.

The methods used for the evaluation of preventive medicine and health services are discussed in this report, prepared by a working group convened by the World Health Organization's Regional Office for Europe. Factors influencing methods used to evaluate are the level of evaluation (comprehensive systems versus single measures), the state of knowledge about the value of measures or programs and their application, and the use of routine health information systems as opposed to ad hoc techniques. The evaluation of medical care must consider efficacy, effectiveness, and efficiency. Six methods of evaluation are opinion, descriptive-analytical studies, experimental studies, systems analysis, simulation models, and cost-effectiveness or cost benefit analysis. Special consideration is paid to the role of randomized trials in evaluation, ethical and operational constraints on the use of the randomized approach, the use of randomized trials in preventive medicine and health service research, and priorities and criteria for the use of randomized designs in research designed to evaluate programs and procedures in preventive medicine and health services.

HRP-0031184/5 PC **A03**/MF **A01**
Pierce County Health Council, Tacoma, WA.
Pierce County Health Education Development Guide.
Sep 78, 50p
Grant PHS-10-P-550002-03

This guide's focus on health education and health promotion in Pierce County, Washington Health education is significant because the quality of life can be improved by appropriate personal health behavior and the cost of medical care can be minimized by more appropriate use of the medical care system. Some diseases can be prevented by adequate nutrition, rest, and exercise. In health education, however, it must be recognized that health care is not synonymous with medical care and that prevention is more cost-effective than therapy and rehabilitation. The guide for Pierce County, developed by the health council, notes these steps in the development of a health education plan: define health education; identify a health education system; derive working definitions of health education; view health education as a process with intellectual, psychological, social, and cultural dimensions; and evaluate factors affecting health. A model for health education incorporates basic components of a health education system, including people, perceptions and beliefs that influence health-related behavior, and motivation, as well as other factors. Basic resources for health education are defined as organizations, agencies, and individuals, with responsibility for providing health education to clients, students, employees, or the public in general. Barriers to health education are identified. The findings of studies involving health education activities of community health agencies, health care providers, and schools are contained in appendixes. Tables and illustrations are included.

HRP-0031185/2 PC **A03**/MF **A01**
Michigan Cooperative Health Information System, Lansing.
Inpatient Hospital Utilization, Michigan, 1976.
Jul 79, 39p
Contract PHS-HRA-230-76-0309
See also report for 1975, HRP-0028390/3.

Data on the number of discharges from Michigan short-term hospitals in 1976, the number of patient days (by residence of patient, age and sex of patient, and hospital service), length of stay, and occupancy rate are presented. Information was obtained in a cooperative effort of the Michigan Department of Public Health, Office of Health and Medical Affairs in the Michigan Department of Management and Budget, Michigan Association of Health Systems Agencies, Greater Detroit Area Hospital Council, Michigan Hospital Association, and Michigan hospitals. A patient origin and hospital use study was conducted as part of a project to develop a methodology for determining acute care bed need. A total of 224 hospitals providing acute care services are covered in the report. Tabulations present data by county and by health service area. Data show there were 1,417,754 short-term hospitalization and 11,356,545 patient days of care recorded in Michigan hospitals in 1976. This represented a decrease of 1,005 hospitalizations and 252,455 days of care from 1975. The overall rate of hospital utilization was 153.6 hospitalizations per 1,000 population, with medical-surgical services accounting for the largest number of hospitalizations and the largest number of patient days of care. Hospital utilization varied in relation to patient age and sex. There was considerable vari-

ation in occupancy rates among health service areas. Detailed tables are included.

HRP-0031198/5 PC **A05**/MF **A01**
Florida Panhandle Health Education Resource Center, Panama City.
New Organizational Avenues for Health Education — A Guide for Development of a Health Education Resource Center,
Allen W. Imershein, and Jerry W. Davis. Jun 79, 92p
Contract DHEW-200-76-0637

An analytical commentary on health education resource center development and a practical guide for the development of new centers are presented. The discussion centers around a case history involving the Florida Panhandle Health Education Resource Center (conceptualization, preliminary planning, implementation, organizational development, and future directions), a sample review of health education resource centers in the United States (Alabama, Pennsylvania, New York, Maine, New Mexico, and Michigan), health systems agencies (Florida health systems agencies and other agency plans for health education resource centers), and a model health education resource center (structure, mission and functions, implementation, and budgeting and sources of funding). Linkages and continuity are shown to be important during the early developmental stages of health education resource centers. Establishing contact with community agencies may be less difficult than expected. The importance of locating a center's office in a central part of a particular region is stressed. Difficulties associated with the establishment of health education resource centers are noted, and activities of existing centers are detailed in terms of functions, membership, staffing, and funding. Appendixes contain procedural information to aid in the operation of health education resource centers, including articles of incorporation, bylaws, work plans, model agreements, legislation, and an indexing system, personnel policies, board membership forms, and a health education resource directory format.

HRP-0031210/8 PC **A03**/MF **A01**
Midwest Center for Radiological Physics, Madison, WI.
Quality Assurance in Mammography - Diagnosis of Artifact Sources in the Xeroradiographic Systems,
L. A. DeWerd. May 79, 45p
Contract N01-CN-4-5152
Prepared in cooperation with American Association of Physicists in Medicine, Chicago, IL. Midwest Chapter.

The maintenance of high-quality assurance programs at xeroradiographic facilities is discussed. In the field of diagnostic radiology, quality assurance involves routine testing procedures designed to maintain optimum image quality within the bounds of safe X-ray exposure to the patient. Artifacts are patterns appearing in the X-ray picture that do not correspond to the subject's actual structure. These artifacts are produced by the imaging system. Artifacts resulting from X-ray technique are briefly discussed. In addition, four interrelated components of the xeroradiographic system that cause artifacts are identified. Procedures for diagnosing a problem in the xeroradiographic system are explained. A flow chart illustrates these procedures in relation to the four component problems, including conditioner or processor difficulties and plate or cassette malfunctions. Mammographic phantoms can serve for general quality assurance tests on a xeroradiographic system. Pictures illustrating 31 types of artifacts are provided. A bibliography of xeroradiography references is included.

HRP-0031226/4 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. School of Social Work.
Interdisciplinary Primary Care - A Future Service Delivery Model,
Peter Hookey. Oct 78, 15p
Paper presented at the Annual Program Meeting of the American Public Health Association, Los Angeles, California, October 1978.

A transcript of a speech on interdisciplinary activities in primary care settings is presented. Primary care is defined as services provided by helping professionals or laymen in first contact situations. Interdisciplinary primary health care is frequently provided by physicians bringing other helpers such as social workers onto their staffs. The Swedish and Dutch experiences with primary care are reviewed. Stimulus for American primary care systems is provided by public interest in holistic health care. Increasing emphasis on multidisciplinary education has produced a growing labor pool in many fields. Integrated primary care could thus be based on existing structures such as community mental helth center and family service agencies. It is suggested that integrated primary care will begin at city and subcity levels. If such facilities do develop, will impact on the schools of social work. These schools tend to promote specialized consultants. Integrated primary care requires social workers who have broader backgrounds. Plans for interdisciplinary education should include pastoral counselors, since it is likely that they will be heavily involved with primary care. It is concluded that social workers will have to adapt to the development of interdisciplinary primary care systems.

HRP-0031332/0 PC **A04**/MF **A01**
American Dental Association, Chicago, IL.
Survey of Dental Practice, 1977.
c1978, 54p
See also report dated 1975, HRP-0019434.

A survey was conducted by the American Dental Association in 1977 to obtain data on selected aspects of dental practices. Variables in the stratified sampling procedure were practice type, geographic distribution of dentists by region and State, and year and State of graduation from dental school. The 6-percent sample of 101,261 practicing dentists resulted in 6,490 mailed survey questionnaires; 2,776 usable returns were received for a response rate of 46.5 percent. Analysis covered each dentist's work schedule, the number of patients seen, the number of patients' visits, and the use of auxiliary personnel. Economic aspects of dental practice were also evaluated, with reference to professional expenses, total income from dentistry, and net and gross income from the primary practice of dentistry. General practitioners and specialists had mean net incomes of $41,178 and $60,088, respectively. Independent dentists had a mean net income of $43,033. The median monthly salary of auxiliaries (hygienists, chairside assistants, secretaries, laboratory technicians, and bookkeepers) ranged from $558 to $996. Mean data on office characteristics of dentists practicing alone revealed the following: 78.7 visits per week; 67.5 patients per week; 40.8 hours per week in the primary practice office; and 33.5 hours per week in contact with patients. Supporting data are tabulated and the survey questionnaire is included.

HRP-0031341/1 PC **A05**/MF **A01**
Minnesota Higher Education Coordinating Board, St. Paul.
Planning for Optometric Education in Minnesota.
Jan 77, 92p PLANNING-13

Minnesota's Higher Education Coordinating Board, after studying the supply and demand of optometrists in Minnesota, made the following recommendations to the legislature: Minnesota should subsidize the education of 13 optometrsts per year to maintain the current level of optometric service, which is adequate; the need for 13 optometrists per year is not great enough to warrant establishing a school of optometry; the cost of contracting for the 13 seats at existing schools would be $156,000 every 2 years; and the State should discuss with other neighboring States the feasibility of establishing a regional school of optometry. Those recommendations were made after the board investigated data and projections of demand, shortfall, costs of education, location of schools and availability of spaces, costs of new schools of optometry, contracting procedures and regional opportunities. A 14-item bibliography is included. Seven appendices include the admissions and contracting policies of U.S. schools of optometry, tables of projected supply for optometrists, and various tables of admissions to schools of optometry in the years 1975 and 1976.

HRP-0031407/0 PC **A04**/MF **A01**
Puget Sound Health Systems Agency, Seattle, WA.
Forecasts of 1980 Admissions and Patient Days of Northwest Washington Hospitals.
Research rept. no. 6,
Linda Styron. Oct 79, 58p
Grant PHS-HRA-10-P-55000-2-04

Procedures developed by the Pugent Sound Health Systems Agency in Washington to forecast hospital use in 1980 are detailed, and forecast data by hospital are presented for the region. Reliance is placed on trend data to forecast hospital use on a prediction methodology that relates hospital use in the area to the general employmentof residents. Area forecasts are applied to individual hospitals. Forecasts for individual hospitals in 1980 are illustrative rather than exact because the following conditions are not taken into account: capacity constraints; mergers, consolidations, and changes in the number or mix of services offered; and ability of hospitals to attract personnel needed in serving more patients. Steps involved in making trend forecasts and employment forecasts are outlined, and trend and employment forecasts are compared. Patient days predicted for the region in 1980 are evaluated in light of the anticipated capacity of the hospital system. Data are included in tabular form.

HRP-0031408/8 PC **A02**/MF **A01**
Colorado Univ. Medical Center, Denver. Center for Health Services Research.
Cost Per Episode of Home Health Care, Executive Summary,
Bettine T. Kurowski, Robert E. Schlenker, and Gerri Tricarico. Mar 79, 20p
Contract PHS-HSA-240-77-0148

Variations in the cost of home health care by illness episode were studied, with cost defined to include skilled nursing, physical therapy, speech therapy, occupational therapy, social, and home health aide services. Utilization and cost information was obtained from two home health data sets. The primary dependent variable of the study was cost per episode. Independent variables were classified as patient-specific, outcome-related, and provider/health system variables. The number of total visits per illness episode was similar for the two data sets 16.35 visits per episode in the Philadelphia, PA., sample and 18.25 visits per episode in the Massachusetts sample. The cost per episode was higher in Philadelphia ($522 than in Massachusetts $257). Many factors affected the cost of home health care. The category of patient-specific variables was the most significant of all independent variables in terms of the ability to explain variations in cost per episode. Research and policy implications of the study findings are discussed.

HRP-0150101/4 PC **A03**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Health Planning in Action, Achieving Equal Access to Quality Health Care at a Reasonable Cost.
Oct 79, 27p DHEW/PUB/HRA-80-14000

A collection of case studies of successful planning efforts by seven Health Systems Agencies (HSAs) demonstrate that HSAs created under P.L. 93-641 are helping to control capital expenditures by hospitals and thereby moderate increases in health care costs. Similarly, by improving access and availability of health care services and bringing about broad systems changes, HSAs are beginning to fulfill the mandate of the law. Several agencies demonstrated successful activity in reducing excess bed capacity and holding the line on proposed new services. The Central Ohio Valley Association HSA achieved a $18.5 million savings by developing a proposal to replace two inefficient neighboring hospitals with a new consolidated hospital with 74 fewer beds. The Finger Lakes HSA in New York State initiated the shaping of a regionalized hospital system in cooperation with the State health planning authorities. The seven exemplary case studies show that planning agencies must do considerable groundwork by developing sound plans, specific objectives, and by compiling and analyzing data and conducting specific studies to be able to act decisively and authoritatively. Agencies must develop collaboration with communities and organizations and be sensitive to the general concerns on prevailing issues.

HRP-0900153/8 PC **A03**/MF **A01**
American Medical Students Association, Gainesville, FL. Center for Applications of Psychological Type.
Application of the Myers-Briggs Type Indicator to Medicine and Other Health Professions.
Executive summary rept.,
Mary H. McCaulley. Aug 77, 33p
Contract PHS-HRA-231-76-0051

The purpose of this project was to bring together and describe what is known about psychological types in medicine and other health professions. The concept of psychological types is one part of the comprehensive theory of the Swiss physician and psychologist, C. G. Jung, who observed that many seemingly random differences in people can be explained if one knows how they prefer to use their contrasting powers of perception and judgment. The theory is concerned with valuable differences in normal people, and the ways people make conscious decisions in directing their lives. The Myer-Briggs Type Indicator is a questionnaire designed specifically to make it possible to test Jung's theory of types, and to put its insights to practical use.

HRP-0900176/9 PC **A09**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Planning, Evaluation, and Legislation.
Transcript of Testimony, Public Meeting on Proposed National Health Planning Guidelines. Standards 1 and 2: General Hospitals - Bed-population Ratio, General Hospitals - Occupancy Rate.
7 Nov 77, 187p

The volume contains the transcript of one of six public meetings which were held by the Department of Health, Education, and Welfare in November 1977 to discuss proposed National Guidelines for Health Planning. These had been developed by the Department pursuant to Section 1501 of the National Health Planning and Resources Development Act (P.L. 93-641) and published as proposed rules on September 23, 1977.

HRP-0900616/4 Not available NTIS
Wisconsin Univ.-Milwaukee. School of Nursing.
The Study of Credentialing in Nursing: A New Approach. Volume I. The Report of the Committee,
Inez G. Hinsvark. cJan 79, 127p
Sponsored in part by American Nurses' Association, Kansas City, MO.
Available from American Nurses' Association, 2420 Pershing Road, Kansas, MO. 64108.

The American Nurses' Association contracted with the University of Wisconsin to form a committee to examine credentialing in nursing. The purpose of the committee's study was to address all aspects of the credentialing of institutions and individuals in the field of nursing (accreditation, certification, licensing, and degree designation). The committee was comprised of nurses and other professionals. It identified the basic problem as confusion about and conflict in the credentialing system. A model was constructed to explore the role of credentialing within the broad scope of activities related to the nursing profession. Principles appropriate to credentialing endeavors were devised, and contemporary issues in nursing were considered. Priority issues ranked by the committee were nursing definitions, entry into practice, educational mobility, control over credentialing, cost of credentialing, accountability, and competence. These issues are addressed in relation to the impact of credentialing on nursing, principles of credentialing, and the application of credentialing to nursing. Recommendations to enhance the credentialing process are offered. Additional information on the work of the committee is appended.

HRP-0901258/4 PC **A05**/MF **A01**
University of Southern California, Los Angeles. Div. of Research in Medical Education.
Comprehensiveness of Care and Physician Productivity in Family Practice.
Final rept.,
Robert C. Mendenhall. Sep 78, 90p USC/DRME/D-1087
Contract PHS-HRA-231-77-0115
Sponsored in part by Robert Wood Foundation, Princeton, NJ.

Data on comprehensiveness of care and productivity were obtained from a survey of family practice physicians using a self-administered log/diary. Of a population of 9,180 family practice physicians, 683 participated in the survey, and the data from 351 were analyzed. The log responses consisted of summaries of patient encounters for 1 week and background information on the practice structure and services. Comprehensiveness of care was conceptualized as practice scope, range of medical services, and the treatment of nonorganic problems. Physician productivity variables included physician workload in terms of number of patients, productivity in terms of patients seen per working hour, and direct patient care productivity. A multiple regression analysis was performed to determine the interrelationships between comprehensiveness variables and productivity variables. The data and correlations are presented in 22 tables. The appendixes provide sample log/diary pages; a discussion of the development of the patient encounter classification algorithm; and the means, standard deviations, and zero-order correlations for the study variables.

HRP-0901290/7 PC **A13**/MF **A01**
Houston Univ., TX. Coll. of Optometry.
Interdisciplinary Care of the Learning Disabled,
Diana Phelps, and Rocky Kaplan. 1978, 297p

The problems that are encountered in the classroom with learning disabled persons are addressed. Emphasis is placed on the remediation of learning disabilities by a team or interdisciplinary approach in which professionals from various disciplines collaborate in all phases of diagnosis and treatment. The Education of All Handicapped Children Act (Public Law 94-142) and amendments mandate certain rights to education and treatment for children with handicaps. The act defines learning disabilities as discrepancies between achievement and intellectual abilities in one or more of the following areas: oral expression; written expression; listening-reading comprehension; basic reading skills; mathematical calculations; and reasoning or spelling. An interdisciplinary model for dealing with learning disabled persons is presented that was developed at the University of Houston. The model is detailed with respect to roles, responsibilities, and contributions of participating disciplines; structural and operational aspects of the interdisciplinary clinic at the University of Houston; diagnostic and remediation courses for learning disabled persons at the interdisciplinary clinic; and interdisciplinary team remediation procedures. Parent questionnaires, teacher questionnaires, and diagnostic instruments associated with the learning disabilities model are included. References are cited.

HRP-0901351/7 PC **A12**/MF **A01**
West Arkansas Health Systems Agency, Inc., Russellville.
West Arkansas Health Systems Plan and Annual Implementation Plan, 1978-79. Health Service Area 1, Arkansas.
1978, 265p
Grant DHEW-06-P-000157-04

This health system plan (HSP) and annual implementation plan (AIP) are for a predominantly rural area. The HSP is divided into an introduction, area profile, and the plan. High priority health status concerns are: infant mortality, gonorrhea, heart disease, cerebrovascular disease, hypertension, and malignant neoplasms. High priority health system concerns are: health education, immunization, detection, emergency medical care, obstetric services, home health, nursing home services, health planning, primary care manpower, facilities, equipment, financing, and regulation. Second-level priority health status and health system concerns are also covered. The AIP has three sections, with the first section covering: an introduction, the purpose and use of the AIP, statutory authority for health planning, the planning process and framework, an AIP progress report for 1977-1978, and components of the AIP for 1978-1979. The remaining two sections deal with priority health status concerns (infant mortality, gonorrhea, heart disease, and cancer) and health system concerns (health education, immunization, detection, emergency medical care, obstetric services, nursing home services, health planning, and facilities). Appendixes contain: information on health service area boundaries, a health planning glossary, and standards for selected health services.

HRP-0901532/2 PC **A06**/MF **A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.
Annual Implementation Plan for 1979. Health Service Area 3 Georgia.
May 79, 124p
See also HSP 1979, Volume 1, HRP-0901534, HSP 1979, Volume 2, HRP-0901533 and HSP 1978, Volume 4, HRP-0901102.

The annual implementation plan (AIP) of the North Central Georgia Health Systems Agency, Inc., identifies specific priority short-term objectives relevant to health status and the health system. Introductory comments focus on the purpose of the AIP, the plan development process, priority criteria (technically feasible, severity of the problem, and potential for incremental accomplishment of objectives and recommended actions and resource requirements relative to these objectives), and the organization of the AIP. Substantive sections of the AIP focus on: physical health (prevention and detection, primary care, and secondary and tertiary care); mental health, mental illness, addictive disorders, and developmental disabilities, environmental health; and data management. A progress report on the previous AIP is presented that covers physical, mental, and environmental health and data management. An evaluation plan for the current AIP covers progress measurements, models and techniques, levels of evaluation, environmental and occupational health, prevention and detection, primary care, secondary and tertiary care, and mental health.

HRP-0901533/0 MF **A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.
Health Systems Plan for 1979. Health Service Area 3 Georgia. Volume II - Appendices.
1979, 295p
Grant PHS-04-P-000219-02-01
See also Volume 1, HRP-0901534 and AIP 1979, HRP-0901532.

These appendixes provide additional information on the health systems plan for the 24-county area it serves. The first appendix contains a report on the work of a secondary and tertiary care task force that addressed the problem of excess hospital beds. This task force established a group, comprised of leaders from business and industry, public officials, providers, the media, civil rights representatives, labor representatives, and consumer interests, to examine the excess capacity problem in the health service area and develop approaches to resolve the problem. The group was also asked to explore increased costs associated with excess capacity. The second appendix considers project review and procedures for the development and revision of project review criteria. Project review is important in light of the fact that health systems agencies are required to review and evaluate proposals for new health facilities and services even before the health systems plan is developed. The third appendix summarizes public hearings, held in February 1979, to review and receive comments on the health systems plan and the annual implementation plan.

HRP-0901534/8 PC **A99**/MF **A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.
Health Systems Plan for 1979. Health Service Area 3 Georgia. Volume I. Second Edition.
1979, 711p
Grant PHS-04-P-000219-02
See also Volume 2, HRP-0901533 and AIP 1979, HRP-0901532.

The health systems plan (HSP) is intended to be responsive to community needs and to improve the health of the 24-county health service area. Introductory remarks describe the health systems agency's mission and purpose, legislative authority, organization and functions, membership, and the development and organization of the HSP. National, State, and local health care needs and priorities are identified, followed by an overview of the health service area (geographic, demographic, and socioeconomic characteristics). Health status is considered in relation to perinatal health and

mortality from all causes (crude and age-adjusted death rates, leading causes of death, morbidity, and disability). The health system is described with regard to: the availability of health resources (manpower, facilities and services, accessibility, cost, and quality); environmental and occupational health; physical health and priority physical health problems; prevention and detection; maternal and infant health; cerebrovascular accidents and hypertension; coronary heart disease; cancer; malnutrition; dental health; vision and hearing; communicable diseases and diseases prevented by environmental control; primary care, secondary and tertiary care; mental health, environmental health and general health improvements; long-term support services; and data management and special studies. Health status and health system goals and objectives are included.

HRP-0901535/5 PC **A99**/MF **A01**
Health Systems Agency of North Central Connecticut, Hartford.
Health Systems Plan for 1979 and Annual Implementation Plan for 1979-1980. Health Service Area 4 Connecticut.
Jan 79, 775p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Systems Agency of North Central Connecticut incorporated various aspects of health status and health system development in its health systems plan (HSP) and annual implementation plan (AIP). The introduction to the HSP examines goals and functions of the health systems agency, the legal mandate for health planning, community-based regional planning, cost containment, the purpose and use of the HSP, the structure and process of planning, and national health policies. Health system development focuses on health education and prevention, environmental health, occupational health, emergency and ambulatory care, maternal and child health, acute inpatient and diagnostic therapy, dental health, mental disabilities, long-term care, rehabilitation, and resource development. The following indicators of health status are of importance: economy of the health service area; population density; socioeconomic status and income; mortality in general; infant mortality; morbidity; leading causes of death; and morbidity-communicable diseases. Goals, recommended actions, and resource requirements pertinent to health status and the health systems are summarized, and exhibits and a glossary are included. The AIP ranks selected components from the HSP and delineates short-term recommended actions.

HRP-0901581/9 PC **A99**/MF **E02**
Central Pennsylvania Health Systems Agency, Inc., Lewisburg.
Health Systems Plan and Annual Implementation Plan. Health Service Area 5 Pennsylvania. Second Edition.
1979, 999p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Eratta sheet inserted.

The analysis of health status in this plan encompasses venereal disease, high blood pressure, cancer, chronic renal diseases, diseases associated with cigarette smoking, and mortality. The health system is assessed in terms of community health promotion and protection (environmental quality management, health education, and occupational safety and health), prevention and detection (family planning, immunization, and screening), diagnosis and treatment (clinical laboratories, diagnostic radiology, emergency health services, inpatient medical-surgical services, home health services, inpatient obstetric and pediatric services, mental health and mental retardation, developmental disabilities, drug and alcohol abuse, primary care, skilled and intermediate nursing facilities, specialized ambulatory care, surgical services, and organization and delivery of diagnostic and treatment services), habilitation and rehabilitation (physically disabled), maintenance (adult day care, homemaker and chore services, residential and custodial facilities, and congregate and home-delivered meals), personal health care (social services, information and referral, pharmaceutical services, and transportation), and health system enabling services (financing, planning, regulation, and resource development). Goals, objectives, recommended actions, and resource requirements are stipulated in the health systems plan and the annual implementation plan on a section-by-section basis. A glossary is included.

HRP-0901583/5 PC **A13**/MF **A01**
Northeast Texas Health Systems Agency, Inc., Marshall.
Health Systems Plan and Annual Implementation Plan for 1979-1980, Health Service Area 7, Texas. Volume 1, 2nd Edition.
1 May 79, 286p
Grant PHS-06-P-000208-03
See also report dated Jun 78, HRP-0901035, HSP and AIP, Vol. 2, HRP-0901584; Summary, HRP-0901585.

This health systems plan (HSP) and annual implementation plan (AIP) are the foundation for planning, developing, and reviewing health care facilities, services, and projects in the 23-county area served by the Northeast Texas Health Systems Agency, Inc. Prefacing substantive portions of the HSP is an introduction that discusses the responsibility for health planning, the organizational structure of the health systems agency, the purpose of the HSP, the plan development process, and the methodology for goal and objective prioritization. A description of the health service area characterizes the population with respect to geography and demography. Major sections of the HSP deal with: physical health (maternal and child health, chronic conditions, chronic disease, and dental health); mental health (mental disorders, developmental disabilities, and substance abuse); environmental health (solid waste, drinking water, waste water, animal and vector control, and food sanitation); other health-related concerns (accidental deaths); and health care facilities (cost containmlent, inpatient services, general hospitals, obstetrical units, neonatal care units, pediatric units, intensive care and coronary care units, end-stage renal disease, outpatient care, long-term care, voluntary efforts, personal health care costs, emergency medical services, health manpower, and dental care). The AIP focuses on communicable disease, dental health, mental disorders, developmental disabilities, substance abuse, environmental health, health facilities and services, cost containment, emergency medical services, and health manpower.

HRP-0901584/3 PC **A07**/MF **A01**
Northeast Texas Health Systems Agency, Inc., Marshall.
Health Systems Plan and Annual Implementation Plan for 1979-1980, Health Service Area 7, Texas. Volume 2, Appendix, 2nd Edition.
1979, 138p
See also report dated Jun 78, HRP-0901036, HSP and AIP, Vol. 1, HRP-0901583; Summary, HRP-0901585.

This second volume of the health systems plan and the annual implementation plan, devised by the Northeast Texas Health Systems Agency, Inc., is intended to aid in assessing health problems and in identifying health-related goals to resolve health problems. The volume is in the form of an appendix and covers: physical health, mental health, environmental health, other health-related concerns, and health facilities and services. Materials in the volume primarily consist of forms, tables, and illustrations that may aid in analyzing such areas as: perceived health needs, health programs and services, goal prioritization, death rates by leading cause of death, health manpower, health care facilities, health care costs, diseases by county in region and associated mortality, and hospital beds. A glossary of terms and an index are included.

HRP-0901585/0 PC **A03**/MF **A01**
Northeast Texas Health Systems Agency, Inc., Marshall.
Health Systems Plan and Annual Implementation Plan for 1979-1980, Health Service Area 7, Texas. Executive Summary, 2nd Edition.
1979, 26p
See also report dated Jun 78, HRP-0901034, HSP and AIP, Vols. 1 and 2, HRP-0901583, HRP-0901584.

This executive summary of the health systems plan and the annual implementation plan, developed by the Northeast Texas Health Systems Agency, Inc., focuses on the planning process and associated limitations. Problem statements regarding significant components of both plans are delineated. These components concern: physical health, maternal and child health, chronic conditions, communicable disease, dental health, mental health, substance abuse, environmental health (solid waste, drinking water, waste water, animal and vector control, and food sanitation), and other related topics (accidental deaths, health care facilities and services, health care cost containment, emergency medical services, and health manpower). Health systems plan and annual implementation plan goals pertinent to physical health, mental health, environmental health, and facilities are listed.

HRP-0901666/8 PC **A22**/MF **A01**
Mid-America Health Systems Agency, Kansas City, MO.
Health Systems Plan for 1979-1983, Health Service Area 1, Missouri and Kansas, 2nd edition.
1979, 510p
See also HRP-0901684.

The purpose of the Health Systems Plan is to define a health care delivery system for the eight-county Kansas City metropolitan area which will improve the area residents' quality of life through improvements in health and health care delivery. MAHSA's Health Systems Plan will present a statement that defines the role and scope of the Kansas City area's health care delivery system and a recommendation as to where the system fits into the other social and economic systems which define and describe the society in which area residents function. The Health Systems Plan provides a continuing series of high level policy statements which can and should be used as guides for resource allocation by community leaders.

HRP-0901684/1 PC **A03**/MF **A01**
Mid-America Health Systems Agency, Kansas City, MO.
Annual Implementation Plan, 1979, Health Service Area 1, Missouri and Kansas.
1979, 49p
See also HRP-0901666.

The health system plan is an expression of the changes the community wishes to see in its health system and in its environment and recommendations promoting those changes. The annual implementation plan's (AIP) objectives are designed to fulfill those aspects of the HSP which can be implemented within a year of the long-range Plan's establishment. The AIP identifies the specific priority short-range objectives upon which the community wishes to act during the year. The objectives may not be achievable in one year, but the AIP identifies the actions the community intends to take, and the effects of those actions on the objectives. For example, the AIP describes specific, short-range objectives and actions designed to meet long-term HSP objectives to increase access to long-term care services and to increase preventive services. Specific priority short-range objectives are related to those objectives in the HSP which warrant immediate HSA and community action. The selection of priority objectives for action was based in part on consideration of short-range feasibility, the cost of achieving the objectives in relationship to community resources, and potential impact on the area of concern, as well as the special needs of the area.

HRP-0901756/7 PC **A17**/MF **A01**
Hawaii Statewide Health Coordinating Council, Honolulu.
Hawaii State Health Plan for 1979. Second Edition.
5 Apr 79, 398p
Grant PHS-09-P-001166-04

The State health plan, approved by the Hawaii Statewide Health Coordinating Council, begins with an introductory section on the legal basis for health planning, population-based planning, health status and the health system in Hawaii (premedical care and medical care--primary, secondary, and tertiary care), the continuum of health services, functions of the health care delivery system, patient flow through the health system, and quality of

care. Remaining parts of the plan focus on: diagnosis and treatment--primary care (general medical care, emergency medical services, diagnostic radiology, surgical care, family health care, dental care, and clinical laboratory services), computerized tomography, and behavioral health services; diagnosis and treatment--secondary care (acute inpatient care); tertiary care, high-risk perinatal care, cardiac catheterization and open heart surgery, end-stage renal disease, and radiation therapy; prevention and detection; promotion and protection--community health education, nutrition, and environmental health; maintenance; habilitation and rehabilitation; support services; and physician manpower. Goals and objectives designed to improve health are specified.

HRP-0901760/9 PC **A15**/MF **A01**
Florida Statewide Health Coordinating Council.
Florida State Health Plan (1978).
7 Oct 78, 333p

Comprehensive health planning in the United States had its beginnings in the Partnership for Health Act of 1966 (P.L. 89-749), which established state and areawide health planning agencies throughout the country. These agencies played a major role in determining what activities should be undertaken within the sphere of comprehensive health planning. Following the 1974 assessment of these agencies and the expiration of P.L. 89-749, Congress passed Public Law 93-641, the National Health Planning and Resources Development Act of 1974, the purpose of which was the creation of a national health planning system. This led to the establishment of 205 health service areas throught the United States, each served by a Health Systems Agency (HSA). For purposes of statewide coordination and planning, every state has a designated State Health Planning and Development Agency (SHPDA) and a Statewide Health Coordinating Council (SHCC) appointed by the Governor.

HRP-0901761/7 PC **A18**/MF **A01**
Montana Statewide Health Coordinating Council, Helena.
Montana State Health Plan for 1979-1980.
May 79, 405p
Grant PHS-08-P-000073-03

This document contains the first State health plan developed for Montana to address health needs of citizens on a statewide basis, in accordance with the mandate of the National Health Planning and Resources Development Act (P.L. 93-641). An introductory section describes: structural and organizational relationships in health planning and in the health planning agencies serving the State, the purpose of the State health plan, and the plan development process. Following a section profiling State demographic, geographic, social, and economic characteristics, consideration is given to health status (morbidity, disability, intervention in terms of lifestyle, infant mortality, accidents, suicides, and alcoholism). The following aspects of the health system are reviewed: health system framework; trends in the health care system; relationship between the health system and health status; community health promotion and protection--health education and food and consumer safety; prevention and detection--preventive dental services; diagnosis and treatment--maternal and infant services; maintenance--home health care; and health system enabling services--health care expenditures. National health priorities and guidelines are discussed. Goals, objectives, target groups, recommended actions, and resource requirements associated with health status and the health system are identified. Additional information on State health planning is provided in appendixes. Tables and figures are included.

HRP-0901810/2 PC **A08**/MF **A01**
Appalachian Georgia Health Systems Agency, Inc., Cartersville.
Health Systems Plan for 1978-1983. Health Service Area 2 Georgia. Health Facilities and Services Plan.
14 Jun 79, 171p
See also 2nd edition, HRP-0901548, HSP 1979-1983, HRP-0901809, AIP 1979, HRP-0901811. Sponsored in part by Bureau of Heath Planning, Hyattsville, MD.

The health facilities and services plan developed by the Appalachian Georgia Health Systems Agency is part of the health systems plan in that it delineates policies and guidelines for use by the agency in improving the accessibility, quality, and cost-effectiveness of health care in the area. General hospital services constitute the focus of the plan. Guidelines concern the establishment and operation of computed tomography, cardiac catherization, open heart surgery, and radiation therapy services. Levels of obstetrical and newborn care are defined, and guidelines for inpatient obstetrical, neonatal, and pediatric services are presented. General hospital and nursing home bedneed projections and utilization profiles are included. A hospital emergency department classification system is described. Supporting tables and figures relevant to the analysis of general hospital services are provided. Appendixes contain additional information on hospital and nursing home bed need and health service area methodologies, the availability of neonatal beds, and statistical profiles of general hospitals and nursing homes.

HRP-0901910/0 PC **A99**/MF **A01**
Health Systems Agency of Summit-Portage County, Akron, OH.
Health Systems Plan, 1979-84. Health Service Area 8 Ohio. 2nd Edition.
1 May 79, 633p
Grant PHS-05-P-000223-03-1
See also report dated May 78, HRP-0900410, and HRP-0901911.

This health systems plan (HSP) represents an effort by the Health Systems Agency of Summit-Portage County in Ohio to improve health status and the health system. The introduction considers the statutory authority of the health systems agency (HSA), its purposes and functions, uses of the HSP, the health planning process and methodology, the prioritization of health-related goals, and the health care delivery system. HSA policies with regard to planning and project review are described, and a demographic overview of the health service area is presented. Health status analysis relates to crude death rates, communicable diseases, noncommunicable diseases, accidents and injuries, maternal and child health, and social and emotional disorders. Health system analysis focuses on promotion and protection; prevention and detection; diagnosis and treatment; habilitation and rehabilitation; maintenance services (institutionalized long-term care and alternatives to institutionalization); support services (discharge planning, information and referral, transportation, and mental health support); and enabling services (planning, resource development, and financing). Goals, objectives, recommended actions, and resource requirements are indicated for significant health status and health system areas. Additional information on the plan development process and on national and State health priorities and guidelines and a glossary are appended.

HRP-0902045/4 PC **A99**/MF **A01**
Massachusetts Office of State Planning, Boston.
Massachusetts State Health Plan for 1979.
25 Jun 79, 864p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Prepared in cooperation with Massachusetts Statewide Health Coordinating Council, Boston.

The State Health Plan for Massachusetts represents a policy statement that delineates statewide goals and priorities and addresses health resource allocation. The plan development process has involved health systems agencies; statewide groups representing consumers, health professionals, and health care institutions; institutional and organizational representatives; State agencies; and the Statewide Health Coordinating Council. Purposes of planning are to expand the information base on which decisions are made, to refine and stabilize the decisionmaking process so that its focus is prospective rather than reactive, and to recommend ways of implementing decisions to achieve specified goals and objectives. The introduction to the State Health Plan discusses the National Health Planning and Resources Development Act (P.L. 93-641) and the Massachusetts approach to health planning and implementation, as well as the State Health Plan's organization and structure. Components of the plan deal with health status (historical changes in health status and the population, mortality, and morbidity), health manpower (supply and distribution, need, and professional skills), economics and finance (national trends in health expenditures, Massachusetts trends, and expenditures and public policy), health promotion and disease prevention, ambulatory care (primary care, mental health, and dental health), acute inpatient care (secondary, ancillary, and tertiary services), emergency medical services (legislation and regulation, transportation and communication, manpower, and critical care services), long-term care (institutional and noninstitutional care, mental health, and retardation), and substance abuse (alcohol and drugs).

HRP-0902054/6 PC **A04**/MF **A01**
Massachusetts Hospital Association, Burlington.
Expanded MEDIHC Program.
Comprehensive rept. (Final).
12 Jan 80, 53p
Contract PHS-HRA-232-78-0095

Contents:
Establishment of operational objectives;
Counseling and referral;
Expansion of referral services;
Expansion of vacancy listings;
Expansion of recruitment;
Follow-up of placements;
Attendance at meetings.

HRP-0902055/3 PC **A07**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Develop Methodology for Studying the Impact of the Federal Placement of Dentists on the Local Markets for Dental Services.
Final rept.,
Fanny Gomez Greber. 28 Sep 78, 146p AAI-78-99
Contract PHS-HRA-231-77-0091

The central health manpower problem for policymakers is that of geographic maldistribution. Dentists are not an exception. Legislators and analysts continue to grasp for policies and programs which will affect the location decisions of dentists in ways which will spark a more equitable distribution of resources and services. Among the federal initiatives designed to promote this end is the National Health Service Corps which, some contend, would be effective in helping to remedy the problem of maldistribution. The National Health Service Corps (NHSC) was enacted by Congress in 1970 (in Public Law 91-623) as one of several federal responses to the problem of dental manpower maldistribution. According to its legislation, the NHSC was designed to improve the delivery of health services to residents of communities and areas in the United States that lack the health resources to meet the existing level of medical and dental needs of their populations.

HRP-0902056/1 PC **A02**/MF **A01**
National Health Council, Inc., New York.
National Health Careers Education and Information Project.
Final rept. 1 Oct 77-30 Sep 79.
1979, 16p
Contract PHS-HRA-231-77-0103

The project seeks to strengthen the nation's health resources by designing programs to ensure an adequate future supply and distribution of well trained personnel to provide health care services in areas of need. It permitted the Council to make accessible to the general public accurate and up-to-date health career information vital to the recruitment of the thousands of new health workers needed to meet the requirements of a changing health care delivery system.

HRP-0902057/9 PC **A09**/MF **A01**
Stanford Univ., CA.
Economic Analysis of the Characteristics of the Dental Services Markets.
Final rept.,
Thomas G. Moore. 29 May 79, 200p
Contract PHS-HRA-231-77-0061

An economic model is developed where the structure of the dental services markets is an integral part of the supply and demand for dental services. The three-equation simultaneous system of

demand, supply and concentration shows how the quantity of dental services delivered, fees paid, and distribution of dentists are jointly determined. Other research has concentrated on either non-economic factors that influence market structure or statistical estimations, where the measure of market structure was not part of an economic model. These studies typically employed data on a state or national basis, rather than on local or regional economic markets.

HRP-0902058/7 PC **A06**/MF **A01**
Eastman Dental Center, Rochester, NY.
Description and Analysis of Practice Profiles of Dentists in Relation to General Practice Training.
Final rept.
1979, 105p
Contract PHS-HRA-232-78-0190

Enclosed are revised versions of the objectives, hypotheses and indices and the survey instrument. The survey instrument has been reduced significantly to comply with OMB guidelines. These guidelines are not written but are the experiences of similar projects, as they work their way up the governmental structure in seeking approval from OMB. For example: (1) OMB considers a questionnaire requiring more than 30 minutes to be a burden on the respondent; (2) respondent groups should be less than 2,000; (3) questions primarily should deal with fact and items in the affective area are suspect; (4) no questionnaire has been approved that has utilized the social desirability approach.

HRP-0902059/5 PC **A09**/MF **A01**
Florida Univ., Gainesville. Health Systems Research Div.
Microsimulation Model of Dental Practice. Volume II: User's Manual.
Final rept.,
Kerry E. Kilpatrick, and Richard S. Mackenzie.
Jun 79, 191p
Contract PHS-HRA-231-77-0050

The purpose of this Users Manual is to provide sufficient information to permit utilization of the University of Florida Dental Practice Analysis Model -- Extended (DPAM-X). This model has been developed from the earlier version of the University of Florida model and has greatly enhanced capabilities. Like the earlier model, this new model permits the user to explore the impact of changes in the physical or financial characteristics of the practice upon selected measures of practice output. Here it can be seen that as changes are made in the number and types of personnel task assignments, the number of dentists, the number and allocation of operatories, salaries and other economic factors; the productivity of the practice, utilization of personnel and facilities, and the economic viability of the practice as represented by gross and net revenues may be assessed. As with the earlier model, the new model facilitates multiple experiments so that a whole series of alternative configurations can be quickly evaluated.

HRP-0902062/9 PC **A08**/MF **A01**
Alabama Univ. in Birmingham. Graduate Program in Hospital and Health Administration.
Initiation of Student-Paced Learning Modules in Graduate Training Programs in Health Administration/Planning.
Comprehensive rept. (Final) 1 Oct 78-31 Dec 79.
1979, 156p
Contract PHS-HRA-232-78-0182
See also report dated 1 Oct 78-31 Dec 79, HRP-0902082.

In the fall of 1978, The University of Alabama in Birmingham was awarded a fifteen-month contract to extend its investigation of the use of self-paced modules to increase the sophistication of financial management, health economics, and quantitative methods as taught in graduate programs in health services administration. The first major activity of the project was a national workshop devoted to developing and sharing modules; using modern work-processing technology to develop, maintain, and share modules; and using the modules in the self-paced mode of instruction. Additional activities of the project included counseling sessions at some of the participating universities and working with modern word-processing equipment.

HRP-0902063/7 PC **A06**/MF **A01**
Illinois Hospital Research and Educational Foundation, Oak Brook.
Health Occupations Placement System (HOPS). Expanded MEDHIC Effort Comprehensive Report.
Final rept. 30 Sep 77-30 Sep 79.
1979, 117p
Contract PHS-HRA-231-77-0054

The Illinois Hospital Research & Educational Foundation is pleased to provide the approach taken to achieve the current level of progress toward fulfilling the contracted obligations under the grant. Following is a summary of the approach to meeting the stated goals in the expanded MEDIHC effort. The methodology used to determine the shortage occupations and areas selected as prime problem areas in Illinois Health Care Institutions are defined. The expanded MEDIHC effort in Illinois/The Health Occupations Placement System (HOPS) operates as a statewide resume/referral service for civilian trained health professionals and medically trained veterans.

HRP-0902138/7 MF **A01**
Southeastern Minnesota Health Systems Agency, Rochester.
Health Systems Plan and Annual Implementation Plan for 1979 - Health Service Area 7 Minnesota. Second Edition.
Feb 79, 860p
Grant PHS-05-P-000217-01
Color illustrations reproduced in black and white. Available microfiche only because of poor quality.

This Health Systems Plan is dedicated to the people of southeastern Minnesota. This Plan, along with the accompanying Annual Implementation Plan, was developed under the National Health Planning and Resources Development Act (Public Law 93-641) to identify and address health status and health system concerns and needs within the SEMHSA region. It has been the sincere intent of the SEMHSA Board of Directors to reflect the concerns of regional residents, both consumers and providers, in this Plan. During the development of the Health Systems Plan, SEMHSA involved the community by submitting draft components of the Health Systems Plan to individual providers and provider associations in the region for review and comment, and summaries to each of the county seat libraries in the 11 counties in the SEMHSA region. In addition, SEMHSA conducted a public meeting to receive comments on the proposed Annual Implementation Plan. The SEMHSA Board of Directors is extremely appreciative of all those persons who have so generously given their time and knowledge to establish this Plan.

HRP-0902139/5 PC **A99**/MF **A01**
Nassau-Suffolk Health Systems Agency, Inc., Melville, NY.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 8 New York. Second Edition.
1979, 725p
See also Volume 1 dated Sep 77, HRP-0901006.

The National Health Planning and Resources Development Act of 1974, Public Law 93-641, has introduced a broad range of responsibilities on the local level via the establishment of Health Systems Agencies (HSAs). These responsibilities include, among others, data collection and analysis, plan development and implementation, facility and program services review, as well as resource development. Among the most significant of these responsibilities is the development of a Health Systems Plan (HSP). An HSA is required to establish, annually review, and amend its HSP. This plan is a means of delineating particular health issues/problems in order to guide decision-making regarding the use of health resources, facilities, and federal funds. The problems addressed by the Nassau-Suffolk Health Systems Agency (N-S HSA) in its plan development efforts, spanned a wide range: cost containment, public education, prevention, community-oriented care, advocacy, and public policy, among others.

HRP-0902143/7 PC **A05**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Health Systems Plan for 1979. Health Service Area 4 Michigan. Second Edition.
1979, 88p STUDY-78-15
See also HSP 1978, HRP-0900444. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Systems Plan for West Central Michigan (HSP) was approved by the Board of Directors of the West Michigan Health Systems Agency (WMHSA) on November 21, 1977. It is to be revised annually to take account of additional studies, successful implementation, increased understanding, and changing conditions. This supplement contains the revisions adopted in 1978. Revisions have been made in Chapter III, on the 'Planning Process', and in Chapters V, VI and VII, which include the 'Goals', 'Objectives', and 'Actions' which made up the plan itself. In this supplement, the material from all three chapters (V, VI, VII) related to one goal is placed together for simplicity. The goals are numbered according to the scheme used in the HSP, (see Chapter V, page 65 of the full HSP for an explanation of this scheme). They appear here in alphabetical/numerical order for easy reference to the full HSP. (See the List of Goals on pp. vi to viii of the full HSP).

HRP-0902144/5 PC **A03**/MF **A01**
West Michigan Health Systems Agenc, Grand Rapids.
Annual Implementation Plan for 1979. Health Service Area 4 Michigan.
1979, 49p STUDY-78-14
See also AIP 1978, HRP-0900445. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The plan is for a twelve-county area of just over one million people. The area includes the second-largest metropolitan area in the state, and industrial and port area on the Great Lakes, sparsely-populated rural areas which attract tourists and migrant agricultural workers, and a great deal of beauty, both natural and man-made. While there is great variety within the area, the area as a whole is far from the extremes of poverty with its attendant health care shortages or great affluence with excessive health care facilities. There are pockets of each, but the area as a whole is generally in a middle range among health service areas nationally.

HRP-0902151/0 PC **A02**/MF **A01**
Arizona Hospital Association, Phoenix.
Arizona Expanded MEDIHC Effort.
Final rept. 23 Jan 79-22 Jan 80,
Gregory L. Moore. 1980, 15p
Contract PHS-HRA-232-78-0097

The objective of the Expanded MEDIHC Effort for the period January 23, 1979 to January 22, 1980 were to '...furnish the personnel, material, equipment and facilities necessary to continue the Expanded MEDIHC Effort in the State of Arizona and...exert its best efforts to provide a state focal point of advice and assistance to allied health personnel interested in employment opportunities in underserved health areas of Arizona'.

HRP-0902152/8 PC **A04**/MF **A01**
Michigan Cooperative Health Information System, Lansing.
Licensed Health Occupations, Michigan, Licensed Practical Nurses 1977, Licensed Psychiatric Attendant Nurses 1978.
Dec 79, 63p
Contract PHS-HRA-233-79-2502

A continuing survey of licensed health occupations is carried out by the Michigan Department of Public Health, in cooperation with the Department of Licensing and Regulation and the licensure boards of the professions covered, as part of the Michigan Cooperative Health Information System (MCHIS). The types of information included are: basic data about the licensees such as date of birth, sex, race, and educational background; and data related to professional employment such as location, type of employer, work setting, specialty or principal type of practice, and type of activity. Employment-related data are collected periodically, through a questionnaire included with license renewal applicatons. Responses are processed fo computer access by the Department of Public Health, and are used for summary statistical purposes. Approximately 90 percent of the licensees in each occupation have participated in the survey.

HRP-0902161/9 PC **A20**/MF **A01**
American Inst. for Research, Palo Alto, CA.

An Analytical Study of Physicians' Career Decisions Regarding Geographic Location, The Comprehensive Report.
Rept. for 1 Oct 77-30 Jun 79,
Sandra Reitz Wilson. 1979, 452p
Contract PHS-HRA-231-77-0088
See also HRP-0902162.

The objective of this study was to analyze the career decisions of physicians with respect to the location of their medical practices in order to identify (1) the characteristics and decision processes of physicians who locate in rural or urban shortage areas as well as of those who locate in other areas, and (2) the characteristics of communities that influence retention for some or all physicians. Three hundred thirty-seven current and former National Health Service Corps (NHSC) and 149 non-NHSC physicians, and their spouses, located throughout the U.S., were studied using biographic questionnaires, personal interviews and preference inventories. Data on NHSC site counties and present practice counties were obtained from the BHM Area Resource File. Non-NHSC rural and urban physicians were found to differ in terms of their personal and educational backgrounds and those of their spouses, their specialties, practices and professional activities, and their preferences concerning their practices and residence communities. Differences between physicians in rural shortage and other rural areas, and between those in urban shortage and other urban areas, were also found. These characteristics that distinguished the private physicians in different locations were not generally predictive of the present locations or the retention of NHSC physicians. Physician and community characteristics that were related to retention at NHSC sites and results evidencing an influence of NHSC service on the geographic region and community size of practice were identified. The results are discussed in terms of their implications fo medical school selection, undergraduate and graduate medical training, and operation of the NHSC program.

HRP-0902162/7 PC **A09**/MF **A01**
American Inst. for Research, Palo Alto, CA.
An Analytical Study of Physician's Career Decisions Regarding Geographic Location, Attachment A.
Final rept. 1 Oct 77-30 Jun 79,
Thomas P. Nelson. 27 Nov 79, 189p
Contract PHS-HRA-231-77-0088
See also HRP-0902161.

The study conducted by the American Institutes of Research (A.I.R.) was conducted in order to identify: (1) characteristics and decision-making processes of physicians who choose to practice in physician shortage areas; (2) characteristics of communities which influence location choice, either alone or in interaction with physicians' characteristics.

HRP-0902165/0 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Health Hazard Appraisal: Health Promotion Through Lifestyle Intervention,
Vivian Lin. 28 Mar 80, 14p TECHNICAL ASSISTANCE MEMO-46
Contract PHS-HRA-232-79-0037

Health Hazard Appraisal (HHA) is described as one of the tools recently developed for use in evaluating the degree to which an individual is at risk of becoming ill or dying from selected diseases. The principal hypotheses of HHA are that (1) reducing the prevalence of the risk factors in the population results in decreasing the incidence of disease, and (2) when people are informed about their own risks, they will reduce the probability of developing specific disorders by modifying their behavior. A questionnaire is generally utilized to gather information on personal and family medical history, physical measurements, and lifestyle factors. The completed questionnaire is processed by a computer and analyzed to determine the age the person can expect to reach for his/her family history and lifestyle and the age the person can expect to reach if certain changes in living habits are made. While HHA can be useful, it has its limitations. It is not designed to give diagnosis, to assess the risks of contracting or dying from a pre-existing condition, or to instruct an individual on how to change health behavior. Experiences of current HHA programs and other health promotion programs - some with and some without HHA as a screening tool - are described.

HRP-0902166/8 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Financial Review of Proprietary Dialysis Projects,
Ron Rowell. 21 Feb 80, 10p TECHNICAL ASSISTANCE MEMO-38-REV
Contract PHS-HRA-232-79-0037
Prepared in cooperation with West Bay Health Systems Agency, Inc., San Francisco, CA.

This paper discusses the problems often encountered in the financial review of dialysis projects sponsored by private industry. There is evidence which suggests that some of the companies which sponsor these projects have profited greatly by charging patients in excess of the cost of the services rendered. Although the Medicare Program has some control over profiteering through its power to audit the financial reports which are required for reimbursement, it does not have the authority to audit cost reports submitted by dialysis centers operated under the End Stage Renal Disease Program. While the number of free-standing dialysis units has mushroomed, the number of patients on the less expensive home units has fallen drastically. Sources are provided where forms and reports which may prove helpful in the review process may be obtained.

HRP-0902167/6 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
A Community Planning Approach to Health Facilities Conversion,
Cyril Roseman. 14 Feb 80, 25p TECHNICAL ASSISTANCE MEMO-44
Contract PHS-HRA-232-79-0037
Prepared in cooperation with Hawaii Univ. at Manoa, Honolulu. School of Public Health.

The conversion of inappropriate acute care health facilities to new uses is an idea whose time has finally come. Forces are presently at work to facilitate planning agency involvement with this subject. The major need at the moment for this topic to become a high priority target is the formulation and adoption of a planned methodology or strategy by which a state moves vigorously on this front to explore options for facility conversion within its boundaries. What follows is an outline of such a planned methodology for establishment of a community planning approach to health facility conversion.

HRP-0902170/0 PC **A03**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Promoting Competition in the Health Industry: The Role of Health Planning.
1979, 49p
Contract PHS-HRA-232-79-0036

The cost problems in the health sector result from some basic defects in the system's economic structure. Two broad options are available for public policy to deal with the health system's problems--regulation and development of competition. Regulation substitutes external controls for the discipline of the market. Pro-competitive options would restructure the system so that market forces could operate more effectively. The latter options are receiving increased attention in the Congress, particularly in provisions of Public Law 96-79. This paper explores Congressional intent concerning health planning's role in promoting competition; reviews a number of strategies for improving competition in the health marketplace; and identifies barriers to using the competitive options. A reading list is supplied.

HRP-0902171/8 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Economics of Cost Containment.
1979, 14p
Contract PHS-HRA-232-79-0036

One of the major public issues relating to health and medical care is the problem of increasing health care costs. The cost problem reflects certain economic deficiencies in the health care system which must be dealt with effectively. The range of proposed solutions is broad, and some understanding of the health system's economic problems is essential to an understanding of the solutions and their implications. This brief review of some of the economic problems of health care, and of strategies for dealing with those problems, has been prepared for use by participants in the health planning process.

HRP-0902172/6 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Review Responsibilities Under Title XV of the Public Health Service Act.
16 Apr 80, 23p
Contract PHS-HRA-232-79-0036

Review activities undertaken by planning and development agencies represent the major tool available for translating such agencies' plans into effective changes in the health system in their areas. The development of an effective review mechanism, whatever the specific program may be, involves some basic procedures. This paper explores the basic concepts of review as practices by health planning agencies and the procedural requirements for such reviews. It is intended as an orientation to review for participants in planning agency activities.

HRP-0902174/2 PC **A03**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Capacity Reduction Through Facility Closure and Conversion: A Bibliography with Abstracts.
Apr 80, 42p
Contract PHS-HRA-232-79-0036

The cited material is the most widely available literature on health facility closure and conversion. Intended for use by health planners, the bibliography includes documents and articles issued from 1975 to 1979. References and accompanying abstracts are arranged in four sections: Capacity Reduction, Closure, Conversion, and Merger. An author index is included.

HRP-0902178/3 PC **A22**/MF **A01**
InterStudy, Excelsior, MN.
Comprehensive Market and Regulatory Strategies for Medical Care.
Final rept. 9 May 77-9 Feb 79,
Walter McClure. 1979, 522p
Contract PHS-HRA-230-77-0033

This report develops and evaluates three alternative comprehensive strategies to achieve major health care policy goals. By presenting the basic strategic options in a comparative format, the report is intended to assist health policymakers, providers and managers in both the public and private sector to take a more coherent and strategic approach to the complexly interrelated issues of health care, and make a more informed choice among the strategic alternatives. Three major conclusions in this report are: that an effective market strategy can be broadened to include most existing delivery and financing arrangements with rather minimal modification; that incentives are as crucial in a regulated system as in a market system; and that it may be possible to pursue both the market and strong regulation simultaneously, but this is much more difficult and risky than it may seem.

HRP-0902179/1 PC **A03**/MF **A01**
Arkansas Dept. of Health, Little Rock. Div. of Health Statistics.
Arkansas Health Manpower Statistics - Physicians, 1979.
1979, 28p
Contract PHS-HRA-233-78-2121

This report is based on responses obtained from a survey of physicians conducted by the Division of Health Statistics, Arkansas Department of Health. The survey was mailed December 1978, with the annual license renewal forms to all physicians licensed by the Arkansas State Medical Board. There are 4,634 physicians licensed by the State Medical Board. Responses were received from 4,093 of these physicians. 2,783 are either currently active in the practice of medicine in Arkansas or

reside in Arkansas and are not engaged in active practice. This total includes 16 physicians who practice in Arkansas and live out-of-state. This report centers on these instate physicians especially the characteristics of those active in medicine. Although a number of checks for the accuracy and consistency of responses are made during the coding and data processing operations, the information on which this report is based remains essentially that provided by the individual physicians in their item responses. The possibility for misinterpretation of questionnaire items is always present, and it is possible that a small number of inconsistencies have arisen from such occurrences.

HRP-0902180/9 PC **A02**/MF **A01**
MACRO Systems, Inc., Silver Spring, MD.
Analysis of Deficiencies in the Foreign Medical Education of U.S. Foreign Medical Student Transferees. Volume I. Executive Summary.
Final rept.
23 Apr 79, 16p
Contract PHA-HRA-232-78-0068
See also Volume 2, HRP-0902181.

Section 782 of the Health Professions Educational Assistance Act of 1976 (Public Law 94-484) authorized grants to schools of medicine and osteopathy to conduct programs for the training of U.S. citizens who have transferred or who hope to transfer with advanced standing to American schools from foreign medical schools. The law further directed the Secretary to compile the reports submitted by the schools and submit an analysis and evaluation of the information contained therein to Congress. In providing the above analyses, the report intended to address two basic questions: (1) What are the deficiencies in the foreign medical education of USFMS; and (2) What resources are required to bring these USFMS up to American standards.

HRP-0902181/7 PC **A05**/MF **A01**
MACRO Systems, Inc., Silver Spring, MD.
Analysis of Deficiencies in the Foreign Medical Education of U.S. Foreign Medical Student Transferees. Volume II.
Final rept.
23 Apr 79, 78p
Contract PHS-HRA-232-78-0068
See also Volume 1, HRP-0902180, and Volume 3, HRP-0902182.

The following topics are discussed: (1) Factors contributing to the large number of U.S. students attending foreign medical schools; (2) Recent studies conducted on the foreign medical education of USFMS and related topics; and (3) Programs devised to remedy or reduce USFMS deficiencies, particularly the subject Section 782 program created by Public Law 94-484.

HRP-0902182/5 PC **A08**/MF **A01**
MACRO Systems, Inc., Silver Spring, MD.
Analysis of Deficiencies in the Foreign Medical Education of U.S. Foreign Medical Student Transferees. Volume III. Appendices.
Final rept.
23 Apr 79, 158p
Contract PHS-HRA-232-78-0068
See also Volume 2, HRP-0902181.

The appendix summarizes key characteristics of each of 19 grantees. These case studies provide more detailed information on the content of the programs, the resources used by the grantees, and the impact of the USFMS on the grantees.

HRP-0902183/3 PC **A02**/MF **A01**
Arkansas Dept. of Health, Little Rock. Div. of Health Statistics.
Arkansas Health Manpower Statistics - Dentists, 1979.
1979, 23p
Contract PHS-HRA-233-78-2121

This report is based on responses obtained from a survey of dentists conducted by the Division of Health Statistics, Arkansas Department of Health. The survey was mailed in December 1978, with the 1979 license renewal forms to all dentists licensed by the Arkansas State Dental Board. There are 1,105 dentists licensed by the State Dental Board for 1979. Of 831 dentists who live or work in Arkansas, responses were received from 785. 274 of the total licensed population practice and/or live in other states. This report centers on the in-state dentists especially the characteristics of those active in dentistry. Although a number of checks for the accuracy and consistency of responses are made during the coding and data processing operations, the information on which this report is based remains essentially that provided by the individual dentists in their item responses. The possibility for misinterpretation of questionnaire items is always present, and it is possible that a small number of inconsistencies have arisen from such occurrences.

HRP-0902184/1 PC **A02**/MF **A01**
Arkansas Dept. of Health, Little Rock. Div. of Health Statistics.
Arkansas Health Manpower Statistics - Osteopaths, 1979.
1979, 19p
Contract PHS-HRA-233-78-2121

This report is based on responses obtained from a survey of osteopaths conducted by the Division of Health Statistics, Arkansas Department of Health. The survey was mailed December 1979 with the annual license renewal forms to all osteopaths licensed by the Arkansas State Medical Board. There are 50 osteopaths licensed by the State Medical Board. Responses were received from 45 of these osteopaths. 19 are either currently active in the practice of osteopathy in Arkansas or reside in Arkansas and are not engaged in active practice. This report centers on these in-state osteopaths especially the characteristics of those in active practice. Although a number of checks for the accuracy and consistency of responses are made during the coding and data processing operations, the information on which this report is based remains essentially that provided by the individual osteopaths in their item responses. The possibility for misinterpretation of questionnaire items is always present, and it is possible that a small number of inconsistencies have arisen from such occurrences.

HRP-0902186/6 PC **A06**/MF **A01**
Institute of Medicine, Washington, DC.
Health Planning in the United States: Issues in Guideline Development.
Mar 80, 113p
Contract PHS-HRA-282-78-0163

The report presents the findings of Phase I of a series of studies carried out by the Institute of Medicine (IOM) on health planning goals and standards. The purpose of this study was to (1) examine the policy and research issue related to the health planning program and the National Guidelines; (2) identify research to strengthen and extend the knowledge base and data resources needed in generating Guidelines, and (3) recommend systems for developing future Guidelines. To develop a conceptual framework, the IOM committee examined the history of health planning, the differences between health planning and regulation, and some of the national policy issues that affect health planning. Discussions include some evidence of the effects of health planning in the local communities and the problems planning agencies are experiencing in reducing health care expenditures as they plan for the delivery of health services. Two chapters are devoted to the National Guidelines, defining their role in planning and focusing on the process of their development. The committee makes recommendations and review and updating of the Guidelines and stresses the importance of their flexibility and responsiveness to the changing needs and interests of planning agencies, consumers, providers, payers, and key participants in the health system. Included are extensive bibliographic references and a copy of the final version of the National Guidelines for Health Planning dated March 28, 1978.

HRP-0902189/0 PC **A09**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
A Guide to Appropriateness Review.
Apr 80, 177p
Contract PHS-HRA-232-79-0036

In the December 11, 1979, Federal Register, the Secretary of Health, Education and Welfare published final Rules governing the performance of appropriateness reviews by Health Systems Agencies (HSAs) and State Health Planning and Development Agencies (State Agencies). Such reviews are required under provisions of Title XV of the Public Health Service Act. Fully designated HSAs and State Agencies are expected to begin performing appropriateness reviews in their geographic areas of responsibility within six months following the publication of these Rules or within six months of becoming fully designated, whichever is later. In this document, the Institute for Health Planning reviews the history of the appropriateness review program, the requirements of the Rules, and alternative actions that can be taken by agencies to meet these requirements. These materials are organized into three major sections dealing with the background and scope of the program, issues related to organizing and implementing an appropriateness program, and substantive issues related to the conduct of such programs.

HRP-0902190/8 PC **A13**/MF **A01**
Washington Univ., Seattle. School of Medicine.
Evaluation Reports: Legislative Process Minority Recruiting (WAMI (Washington, Alaska, Montana and Idaho) Project). Volume II,
M. Roy Schwarz. 1979, 284p
Contract PHS-HRA-231-77-0093
See also Volume 1, HRP-0902194, and Volume 3, HRP-0902191. Report on WAMI Project.

The experiment was designed to determine the usefulness of Satellite Communications in the public decision making process which is necessary for operation of an interstate educational program. In part, due to factors beyond program control (delay in receipt of ground terminals, uncertainty of Satellite performance, rigidity of legislative schedules and the turnover of the public servants), it was not possible to conduct all broadcast experiments. Five broadcasts involving the majority, if not all of the objectives, were conducted involving a spectrum of participants including Federal health administrators, legislators, legislative staff members, health planners, physicians, educators, university administrators and students. In general, participants felt that the technology was applicable to the public decision making process, that information could be exchanged in this way, and that the issues discussed were relevant, useful, clear and helpful.

HRP-0902194/0 PC **A07**/MF **A01**
Washington Univ., Seattle. School of Medicine.
WAMI (Washington, Alaska, Montana and Idaho) - Medical Educational Experiments for the Communications Technology Satellite (CTS). Volume I. Executive Summary.
Rept. for 29 Sep 77-12 Oct 79,
M. Roy Schwarz. 30 Nov 79, 136p
Contract PHS-HRA-231-77-0093
See also Volume 2, HRP-0902190. Report on WAMI Project.

The objectives of the contract were to conduct a group of experiments utilizing the Communications Technology Satellite in five program areas related to the unique health manpower problems of the Alaska, Washington, Montana, and Idaho, WAMI region. The program areas were (1) regional faculty sharing; (2) admissions and minority recruitment; (3) medical consultation; (4) independent learning experiences; and (5) the legislative process in the WAMI states with regard to health issues.

HRP-0902195/7 PC **A05**/MF **A01**
Chase, Rosen and Wallace, Inc., Alexandria, VA.
A Study of Dental Treatment Production,
Charles S. Roehrig, and Paul J. Feldstein. 1979, 80p
Contract PHS-HRA-231-77-0057

This study employs the use of 1974 survey data collected under contract for the Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, a subdivision of the Public Health Service. The purpose of the study is to investigate the relationship between the production of dental treatment and the use of various inputs to that production (i.e., estimation of a dental treatment 'production function'). The reasons for such a study are numerous. A knowledge of how dental treatment production varies with the use of inputs provides valuable information about the alternative

methods of meeting the demand for dental treatment. Econometric dental sector forecasting requires knowledge of dental treatment production functions. In addition, production functions are useful for testing certain hypotheses about how the dental sector functions (e.g. the degree of competition and the degree to which dentists hire the economically optimal number of employees).

HRP-0902196/5 PC **A04**/MF **A01**
New York State Dept. of Health, Albany.
New York Expanded MEDIHC Effort Allied Health Manpower Distribution Program.
Final rept. 1 Apr 79-31 Mar 80,
John E. Bailey. 1979, 70p
Contract PHS-HRA-232-79-0028

Prior to the introduction of Operation MEDIHC, a New York State Veterans Health Manpower recruitment program was in existence and administered by the State Department of Health. The Health Resources Commission, an advisory body to the Department, recognized both the shortage of trained allied health personnel in the civilian sector and the ready availability of such personnel being separated from the armed forces. In October 1969, the Commission proposed a program for recruitment of veterans for civilian health careers. Initial program activity began the following month on a state funded level. This report reviews the performance of the New York State Health Department's Veterans Health Manpower Center which served as the Expanded MEDIHC Coordinator in New York State during the period April 1, 1979 thru March 31, 1980.

HRP-0902218/7 PC **A08**/MF **A01**
Professional Examination Service, New York.
Examination Development for Environmental Health Personnel.
Final rept. 1 Oct 78-30 Apr 80,
Craig G. Schoon. 30 Apr 80, 167p
Contract PHS-HRA-232-78-0146
See also HRP-0902217.

The purpose of this project was to develop three technician forms and three technologist forms of a criterion-referenced examination to assess entry-level proficiency in environmental health. To this end, item pools assessing the knowledge and skill statements listed in the five competency domains of the Blueprint of the Knowledges, Skills, and Attributes for Environmental Health Practitioners (NEHA, 1979) were developed. The Blueprint document was an outcome of the Role Delineation and Verification project conducted by the National Environmental Health Association.

HRP-0902219/5 PC **A04**/MF **A01**
Trustees of Columbia Univ. in the City of New York.
Study of the Impact of Regional Boards on the Distribution of Dentists.
Final rept. 30 Sep 78-31 Dec 79.
1980, 52p
Contract PHS-HRA-232-78-0159

This report describes an evaluation of the impact of regional testing on the distribution of dentists in the United States. Specifically, this study attempted to determine whether the emergence of regional testing has influenced patterns of applications to dental schools, enrollments in dental schools, initial practice locations, and mobility by established dentists, as well as trends in the distribution of dentists. The data show an increase in the number of applications to out-of-state schools, but a decrease in out-of-state enrollments in dental schools, and a trend toward more equal population-to-dentist ratios among states. However, the data also indicate that, as of 1978, regional testing has apparently had little if any impact on these developments or on initial practice location or mobility by established practitioners.

HRP-0902221/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Evaluation of the Health Care Financing Administration's Proposed Health Care Reimbursement Limits.
1979, 22p GAO/HRD-80-84

The report is in response to the Subcommittee's concerns that the limits proposed on February 15, 1980, by the Health Care Financing Administration (HCFA) on home health care reimbursements are too high. Specifically, it reviews (1) the accuracy of the data base used to develop the limits, (2) the methodology used in developing the limits, (2) the methodology used in developing the limits, (3) the accuracy of HCFA's estimated savings, and (4) alternative methods HCFA could use in improving existing limits and/or developing subsequent home health reimbursement limits.

HRP-0902227/8 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Health Resources Div.
States Should Intensify Efforts to Promptly Identify and Recover Medicaid Overpayments and Return the Federal Share.
Report to the Secretary of Health and Human Services.
10 Jun 80, 89p HRD-80-77
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Care Financing Administration had not established consistent policies and guidelines for States to use in identifying and recovering Medicaid overpayments. Also, States had not developed systems and procedures for effectively controlling, pursuing, and recovering identified overpayments and for promptly returning the Federal share of recovered overpayments. In the five States--California, Georgia, Florida, New York, and South Carolina--in the review, at least $222.6 million in substantiated and potential overpayments had been identified but not recovered, even though much of this amount had been outstanding for many years. Also, millions of additional dollars in potential overpayments had not been recovered because some States were far behind in making institutional settlement audits and these audits generally identify large amounts of overpayments. Furthermore, the five States had recovered about $18.7 million in Medicaid funds for which they had not returned the Federal share. In some instances these funds had been on deposit in State accounts for several years.

LBL-9751 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
New Particles and Their Application in Medicine.
S. B. Curtis. Sep 79, 24p
Contract W-7405-ENG-48

In recent years there has been increasing interest in the use of new particle beams for various medical applications. The particles being used, fast neutrons, protons, helium ions, negative pions, and heavy ions, have in fact been known and studied for over forty years. They are new only in the sense that, until recently, the medical community has had little experience with them in the clinic. The applications of these new particles to clinical medicine, primarily in the areas of tumor radiotherapy and diagnostic radiography are reviewed. (ERA citation 05:023030)

N80-27077/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Use of Antigravity Suits in the Treatment of Idiopathic Orthostatic Hypotension.
K. Landmark, and S. Kravik. Apr 80, 8p NASA-TM-75804
Contract NASW-3199
Transl. into English from Tidsskr. Norske Laegforen. (Norway), V. 99, No. 30, 1979 p 1530-1531. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Idiopathic orthostatic hypotension is an uncommon disease characterized by a drop in blood pressure when going from a recumbent to a standing position. Treatment by medication generally produces poor results. Three patients at the Royal Hospital in Oslo were treated with antigravity suits and all were able to maintain adequate blood pressures in the standing position. One patient improved dramatically and was able to take short walks while wearing the suit. The two other patients, however, felt that wearing the suits eventually became uncomfortable. This treatment represents a useful treatment alternative for intractable cases.

PATENT-4 186 190 Not available NTIS
Department of the Navy Washington DC
Method of Treating Burns Using a Poly-epsilon-caprolactone.
Patent.
John B. Gregory. Filed 13 Nov 78, patented 29 Jan 80, 2p AD-D007 333/8, PAT-APPL-959 952 Supersedes PAT-APPL-959 952-78, AD-D005 672.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Composition and method for emergency treatment of burn injuries are disclosed. A solution of poly-epsilon-caprolactone and triethyl citrate plasticizer or triacetin plasticizer in a volatile solvent such as methylene chloride is applied to the burn area by spraying or swabbing. Upon evaporation of the solvent a flexible film of the plasticized polymer is left to serve as a partial barrier to water loss. (Author)

PB80-196504 PC **A10**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Professional Standards Review Organization 1979 Program Evaluation.
Final rept. 1974-78.
May 80, 217p DHHS/PUB/HCFA-80-03041
See also report dated 1978, PB-292 114.

This evaluation report includes six areas of study: PSRO impact on hospital utilization, benefit-cost analysis of concurrent review, PSRO review costs, PSRO impact on quality of care, PSRO organizational models, and PSRO program status. The report shows that for the second consecutive year the PSROs have reduced Medicare hospital utilization relative to inactive PSRO areas, and that, overall, the PSRO Medicare concurrent activity continues to pay for itself. The PSRO impact, however, is not uniform across the nation. This report also presents the first major study of PSRO impact on physician compliance with quality of care criteria. The study shows that Medical Care Evaluation studies can and do identify variations from quality care. When PSROs identify variations from accepted standards, compliance with those standards improves significantly over time. An attempt was mde to compute Medicaid hospital utilization rates using four PSROs as case studies. The analyses indicate that existing Medicaid data sources are not sufficiently well developed to permit an adequate assessment of PSRO activities in that sector. Although the program is estimated to pay for itself, the operational costs are increasing, partly due to increased conduct of profile analysis, areawide MCE studies and other forms of review activities.

PB80-196538 PC **A06**/MF **A01**
Minneapolis Medical Research Foundation, Inc., MN.
Acid-Base Regulation in Hemodialysis.
Final rept. 30 Jun 75-30 Dec 76,
Ronald L. Wathen, Prakash Keshaviah, and Christina Comty. 6 Mar 80, 104p AK-1-5-2221-F
Contract N01-AM-5-2221

In the present contract, several factors capable of influencing the acid-base homeostasis of the dialysis patient were evaluated. Among these factors were: (1) dialyzer clearances of intermediary metabolites; (2) the effects of dialysate glucose on intermediary metabolism; and (3) the effects of varying acetate dialysate concentrations (0 yields 45 mEq/L) on pH and blood gas relationships, ventilation, intermediary metabolism and CNS electrical activity. It was determined that the dialyzers tested had substantial clearances of intermediary metabolites which might lead to substantial acid-base inequity, that the absence of glucose from the dialysate provoked gluconeogenesis and that large acetate loads created excessive alkalosis, saturated Kreb cycle capacity for acetyl CoA and resulted in CNS electrical dysfunction (excess slow wave activity).

PB80-196827 PC **A02**/MF **A01**
Texas Univ. Health Science Center at Dallas.
Noninvasive Diagnosis of Pulmonary Embolism: Positive Image Scanning Agent for Pulmonary Embolism.
Annual rept. 1 Jul 79-30 Jun 80,

James E. Wilson, III, and Robert W. Parkey. Jun 80, 17p NIH-N01-HR-92903-1A
Contract N01-HR-9-2903

Ventilation-perfusion scans are not reliable for the diagnosis of pulmonary embolism in the presence of an infiltrate on chest roentgenograms and 75% of patients with pulmonary emboli have an infiltrate. A better noninvasive diagnostic test for pulmonary emboli is needed. Preliminary studies in the laboratory have shown that 99mTc labeled heparin concentrates on pulmonary emboli and in areas of temporary coronary artery occlusion. Minor modifications produced an excellent imaging agent for myocardial infarction produced by permanent coronary artery occlusion. The purpose of the present study was to modify 99mTc-heparin in other ways that might improve adherence to pulmonary emboli or venous thrombi. Preparative isoelectric focusing was used to prepare heparin with isoelectric points that are low, intermediate and high. After labeling with 99mTc, these components were injected intravenously in dogs with experimental pulmonary embolii and venous thrombi. Nine of the 30 dogs had thrombi or emboli that concentrate the labeled heparin component by a factor of 4-9. Results were better with heparin with intermediate pH isoelectric point which had good anticoagulation activity and were poorest with heparin having low pH isoelectric point with the least anticoagulant activity. The next step will be to label heparin with high and low affinity for antithrombin III.

PB80-197197 PC **A03**/MF **A01**
Miami Univ., FL. Dept. of Pediatrics.
Clinical Centers to Evaluate the Efficacy of Antenatal Steroid Therapy in the Prevention of Neonatal Respiratory Distress Syndrome.
Annual rept. Mar 79-Feb 80,
Charles R. Bauer. Mar 80, 38p NIH-N01-HR-62951-3A
Contract N01-HR-6-2951
See also report dated Mar 79, PB-295 607.

As of February 29, 1980 33 months of active patient enrollment was concluded. There are a total of 96 mothers randomized into the study with 104 infants delivered. No complications have been identified that can be related particularly to the individuals within the study. There is an overall followup rate of approximately 80% at 18 months for those who are already eligible. No 36 month exams have been done yet. The incidence of RDS approximates 10% which is smaller to that seen in the non-randomized population. Now that enrollment is ended, all efforts will be aimed at keeping this current population active in the followup program.

PB80-197452 PC **A08**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
National Survey of Family Growth, Cycle II. Standardized Micro-Data Tape Transcript. Tape Contents Manual, Interval File,
William F. Pratt, and Gerry Hendershot. 1980, 162p NCHS/DF-80/005B
Supersedes Rept. no. NCHS/DF-80/005A, PB80-168214. For system on magnetic tape, see PB80-145206.

The National Survey of Family Growth, Cycle II was conducted in 1976 by Westat, Inc., under contract to the National Center for Health Statistics. Home interviews were conducted with 8,611 women 15-44 years of age who were married, previously married, or single with offspring in the household. The data have been used by the National Center for Health Statistics as the basis for a series of reports on the determinants and consequences of patterns of family formation and fertility in the United States. To make the data available to a larger number of persons, a standardized micro-data tape transcript has been prepared for distribution. This Tape Documentation Manual describes that tape transcript; other items needed to use the tape transcript include the reel of magnetic tape containing the transcript itself and the interview schedule.

PB80-199946 PC **A06**/MF **A01**
Medical Coll. of Pennsylvania, Philadelphia. Dept. of Community and Preventive Medicine.
The Effect of Cost Control Incentives in an IPA-HMO. Executive Summary.
Final rept. 30 Sep 78-31 Dec 79,
Gary L. Burkett. 2 May 80, 110p NCHSR-80-49
Grant PHS-HS-03485

This study examines the effects of cost control incentives--including a capitation payment system--on physician practice patterns in an IPA-HMO. At the time of the study this Independent Practice Association (IPA) had approximately 30,000 members who were served by about 130 primary physicians at 62 different medical offices. This HMO's health care utilization statistics compare very favorably with most other federally qualified plans. In order to explore the effects of the incentive system it was hypothesized that physicians with longer experience as HMO providers, and those with larger numbers of HMO enrollees in their practices would exhibit greater responsiveness to the HMO's cost control objectives--relying more heavily on ambulatory and primary care and less heavily on inpatient and specialist services. Analysis of variations in health care utilization patterns between IPA offices provided little support for these hypotheses and produced findings which were the reverse of those predicted--even when several potential confounding variables are controlled.

PB80-929903 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Tumor Growth: Kinetics, Differentiation/Proliferation, Invasion/Metastasis, Non-Immune Host-Tumor Interactions.
Special listing.
1 Jul 80, 85p NCI/ICRDB/SL-341
Supersedes NTISUB/E/299-008.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Cell and tumor growth kinetics; Regulation of cell proliferation and differentiation; Mechanisms and characteristics of tumor vascularization; Mechanisms of tumor invasion and extension; Mechanisms, detection, prophylaxis, and treatment of metastases; Other non-immune host responses to cancer.

PNL-3081 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Anaktuvuk Pass, Alaska Village Census.
W. C. Hanson. May 80, 20p
Contract EY-76-C-06-1830

This report represents an updating of similar censuses conducted at Anaktuvuk Pass, Alaska, during November 1969, September 1972, June 1975, and August 1978. During the initial years of 1962-1964 in the Alaskan radiation ecology studies, centered at Anaktuvuk Pass, it became apparent that various age groups among the residents showed important differences in exp 137 Cs body burdens and that a permanent record of the birth dates and locations would be a necessity. These vital data are the sole record of birth dates and places of several Anaktuvuk Pass people and have proved helpful to them in many contexts. The information has been readily provided and periodically updated with the full knowledge and cooperation of the people. This report must be considered an interim record because the composition of the village resident structure constantly changes; however, the information is as current and as accurate as possible. It is presented here for the interest of the people of Anaktuvuk Pass and the use of scientists and lay persons who recognize the unique qualities of the nunamiut and wish to know more about these people. (ERA citation 05:024668)

6F. Environmental Biology

AD-A085 875/3 PC **A04**/MF **A01**
Agricultural Research Service Gainesville FL
Exploration for Natural Enemies of Hydrilla verticiliata in Eastern Africa.
Final rept.,
Robert W. Pemberton. May 80, 57p WES-MP-A-80-1

This survey of East African water habitats was conducted to find natural enemies of Hydrilla verticillata Royle (Hydrocharitaceae). Since 1960, when it was first recorded, hydrilla has spread through the southeastern part of the United States and has the potential to occupy large portions of freshwater bodies. It not only precludes use of an infested waterway by man but can be ecologically disruptive. A two-phase survey was conducted during September-December 1976--a wide survey through Tanzania and Kenya, followed by an intense survey of Lake Tanganyika, including a preliminary study of hydrilla natural enemies at Kigoma. The noted damage to hydrilla plants was of two types, fish and insect feedings. Fish damage, possibly caused by a chiclid, was in the form of either leaf removal along the stem or the removal of the stem tips. The potentially most important insect found feeding on hydrilla was a Chironomid midge of the genus Polypedilum (species not yet determined). Damage caused by the larvae of this midge was primarily a loss of the apical meristems of the hydrilla shoots resulting in a pruning effect on hydrilla. Recommendations include: (a) Study and evaluate the known natural enemies of hydrilla, Polypedilum sp., fish, mayfly, and caddis fly, to determine their ability to damage hydrilla; and (b) Conduct additional surveys in East Africa to observe hydrilla populations not affected by the meristem borer and to find other natural enemies of hydrilla.

AD-A086 237/5 PC **A02**/MF **A01**
Naval Medical Research Unit No 3 FPO New York 09527
Observations on the Subgenus Argas (Ixodoidea: Argasidae: Argas). 17. Argas (A.) Polonicus sp. n. Parasitizing Domestic Pigeons in Krakow, Poland.
Technical rept.,
Krzysztof Siuda, Harry Hoogstraal, Carleton M. Clifford, and Hilda Y. Wassef. 19 May 78, 13p
Rept nos. NAMRU-3-TR-5/80, NAMRU-3-ACC-1180
Pub. in Jnl. of Parasitology, v65 n1 p170-181 Feb 79. See also AD-A085 844.

No abstract available.

BNL-27406 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Shelf-Sea Ecosystems.
J. J. Walsh. 1980, 75p
Contract EY-76-C-02-0016

An analysis of the food chain dynamics of the Oregon, Alaskan, and New York shelves is made with respect to differences in physical forcing of these ecosystems. The world's shelves are 10% of the area of the ocean, yield 99% of the world's fish catch, and may be a major sink in the global CO sub 2 budget. (ERA citation 05:024650)

CONF-7903105- PC **A05**/MF **A01**
Institute of Ecology, Indianapolis, IN.
Carbon Dioxide Effects Research and Assessment Program. The Role of Temperate Zone Forests in the World Carbon Cycle: Problem Definition and Research Needs.
T. V. Armentano, and J. Hett. Feb 80, 76p
Contract AC02-79EV10040
Conference on the role of temperate zone force in the world carbon cycle, Indianapolis, IN, USA, 21 Mar 1979.

The continuing rise in the CO sub 2 content of the atmosphere has produced concern that in the next half-century, climatic, ecological and societal effects may occur throughout the world which will not easily be reversed. This prospect has encouraged a critical assessment of the many elements of the global carbon cycle and the influence of man on it. The role of the terrestrial biosphere has been underscored by recent evidence that reduction of the world's biota may be adding as much or more carbon to the atmosphere as combustion of fossil fuels. The diversity of world ecosystems, and the lack of data on carbon content in many of them, have led to different interpretations of how much the terrestrial biosphere contributes to carbon accumulation in the atmosphere. A detailed review is needed of the principal elements of biospheric influence on the carbon cycle, of where the accumulating atmospheric carbon is originating, and of the options there may be to control it. The Office of Carbon Dioxide Effects Research and Assessment of the US Department of Energy has funded The Institute of Ecology to evaluate

three terrestrial biospheric components which may be important in the world carbon cycle. These components are: the temperate zone forest, particularly over the past 100 years; organic soils of the world; and freshwater systems subject to eutrophication. From 10 to 12 researchers have participated in each panel. Data review, problem definition and recommendations for research have been the focus in each workshop. The results reported here cover the temperate forest component. (ERA citation 05:022911)

CONF-790462-2 PC **A03**/MF **A01**
Oregon State Univ., Corvallis. School of Forestry.
Dynamic Belowground Ecosystem.
W. F. Harris, D. Santantonio, and D. McGinty.
1979, 31p
Contract W-7405-ENG-26
Colloquium on Ecosystem analysis, Corvallis, OR, USA, 26 Apr 1979.

Roots comprise the primary interface between plant and soil for uptake of water and nutrients. Much is known about the biochemistry, cell physiology and membrane physics associated with these important processes. In this paper we discuss the role of the belowground ecosystem, especially the autotrophic root component, in the structure and function of forest ecosystems. Beyond recognizing roles of anchoring terrestrial plants and uptake of water and nutrients, this component of the forest has been largely neglected in an ecosystem context. In order to focus discussion on the properties of the belowground ecosystem, we use the term rhizosphere to include roots, mycorrhizae, microbes, and rhizophagus invertebrates. (ERA citation 05:022965)

CONF-7910141-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Monitoring on Rights-of-Way and the National Biomonitoring Inventory.
R. L. Burgess, and E. E. Huber. 10p
Contract W-7405-ENG-26
Symposium on environmental concerns in rights of way management, Ann Arbor, MI, USA, 16 Oct 1979.

Monitoring programs dealing with rights-of-way have been identified from the National Biomonitoring Inventory data base. Monitoring programs cover a wide variety of ecological concerns and geographical areas and occur along oil and gas pipelines, electric power transmission corridors, highways, and railroads. Programs are located from California to Connecticut and Alaska to Florida. Ecologically sensitive areas can be identified and mitigation measures considered during early stages of the route selection process and baseline inventories prepared for monitoring programs can be used for environmental impact assessment. The Biological Monitoring Inventory data base at Oak Ridge National Laboratory can provide a great deal of pertinent information for project planning, environmental assessment, and post-operational management. Examples of actual monitoring programs are presented for a variety of rights-of-way, including transmission corridors, highways, and pipelines. In addition, we have shown, both with hypothetical and concrete examples, how the Inventory can be used. (ERA citation 05:024642)

CONF-7910154-1 MF **A01**
Oak Ridge National Lab., TN.
Future Lignite Mining in the South and Impacts on Fish and Wildlife under SMCRA.
R. J. Haynes. 1979, 32p
Contract W-7405-ENG-26
33. annual conference of the Southeastern Association of Fish and Wildlife Agencies, Hot Springs, AR, USA, 21 Oct 1979.
Microfiche copies only.

Large deposits of recoverable lignite (> 16 billion tons) occur in parts of Alabama, Arkansas, Louisiana, Mississippi, and Texas. Commercial surface mining of these reserves has occurred only in eastern Texas, but additional mining has been proposed for Texas and the other states during the 1980's. Almost all of the new mining would occur in the Southeastern Mixed Forest (Pineywoods) ecoregion, and the Prairie Parkland ecoregion of eastern Texas. Potential impacts on fish and wildlife will be lessened because of the enactment of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87) and the permanent program regulations. However, major impacts on fish and wildlife may still occur as a result of habitat destruction and inadequate reclamation strategies. The prevention of significant impacts will depend mostly upon the diligent implementation and enforcement of the requirements of the Act, including evaluation of fish and wildlife impacts by trained and competent biologists. These issues and research and assessment needs are discussed. (ERA citation 05:021676)

CONF-791103-107 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Iodine-129 Dose to the World Population from the Nuclear Power Industry.
D. C. Kocher, and J. E. Till. 1979, 8p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

Because of the 15.7 million-year half life for exp 129 I and the mobility of iodine in the environment, releases of exp 129 I result in potential radiological impacts on the entire world population essentially in perpetuity. This paper presents estimates of dose to the world population from releases of exp 129 I by the world nuclear power industry during the years 1975 to 2020. (ERA citation 05:024628)

CONF-800403-13 MF **A01**
Oak Ridge National Lab., TN.
Estimates of Dose to the Population within Fifty Miles Due to Noble Gas Releases from the Three Mile Island Incident.
C. W. Miller, S. J. Cotter, R. E. Moore, and C. A. Little. 1980, 8p
Contract W-7405-ENG-26
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.
Microfiche copies only.

Estimates have been made of the dose to the population within 80 km (50 miles) due to noble gas releases from the Three Mile Island Unit 2 incident for the period March 28 to April 15, 1979. Source term, meteorological, and monitoring data used in these estimates were supplied by the Task Group on Health Physics and Dosimetry of the President's Commission on the Accident at Three Mile Island. The 22.5 exp 0 sector-averaged form of the Gaussian plume atmospheric dispersion model was used to calculate doses due to immersion in air and inhalation. The best estimate of the population dose to the total body is 15 person-sieverts (1500 person-rem). (ERA citation 05:022425)

CONF-800543-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Investigations of Entrainment Mortality among Larval and Juvenile Fishes Using a Power Plant Simulator.
G. F. Cada, J. S. Suffern, K. D. Kumar, and J. A. Solomon. 1980, 30p
Contract W-7405-ENG-26
National workshop on entrainment and impingement, San Francisco, CA, USA, 5 May 1980.

A Power Plant Simulator (PPS) was constructed at the Oak Ridge National Laboratory to examine the component sources of entrainment mortality. This experimental apparatus circulates temperature-controlled water through a closed loop consisting of a pump, a condenser bundle, and vertically adjustable piping. Larval bluegill, channel catfish, carp, largemouth bass, and smallmouth bass and juvenile bluegill and mosquitofish were exposed to different combinations of pump speed and water temperatures in the PPS. Wide differences among species in their sensitivity to pipe and condenser passage were observed. For most of the species tested, short-term conditional mortalities resulting from the physical stresses of pipe and condenser passage increased with delta T and/or pumping rate. Pump passage was not a major source of physical damage, and no clear relationship was found between pump efficiency and mortality. Susceptibility to physical stresses associated with entrainment was inversely related to the size of the entrained organisms. Delayed mortality frequently occurred among fishes exposed to stresses in the PPS. However, delayed mortality estimates in these experimental groups were significantly greater than corresponding values in handling control groups in only 15 of 64 comparisons. Like short-term mortalities, relatively higher delayed mortalities were often observed for the smaller species tested. (ERA citation 05:023140)

DOE/EV/02874-69 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Asthma and Air Pollution in the Los Angeles Area. Technical Report No. 35.
A. S. Whittemore, and E. L. Korn. Mar 80, 35p
Contract AC02-76EV02874

Daily asthma attack diaries of sixteen panels of asthmatics residing in the Los Angeles area were collected by the Environmental Protection Agency for 34 week periods during the years 1972 to 1975. These data are examined here for the relationship between daily attack occurrence and daily levels of photochemical oxidant, total suspended particulates, minimum temperature, relative humidity, and average wind speed. A separate multiple logistic regression is used for each panelist's attack data. Variables representing the presence or absence of attack on the preceding day, as well as day of week and time since the start of the study, are included in the regressions. The most significant predictor of attacks was the presence of an attack on the preceding day. On the average, the panelists tended to have increased attacks on days with high oxidant and particulate pollution, on cool days, and during the first two months of the study. Panelists' attack propensity also differed by day of week; in particular they had more attacks on Saturdays (the last day of the weekly reporting period) than on Sundays. Each panelist's regression coefficients are classified according to his age, sex, hay fever status and self-assessed attack precursors; this classification is used to examine subgroups among the panelists with high coefficients corresponding to the above factors. (ERA citation 05:024776)

DPSPU-80-30-1 PC **A04**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Environmental Monitoring in the Vicinity of the Savannah River Plant. Annual Report for 1979.
1980, 61p
Contract EY-76-C-09-0001

An extensive surveillance program has been continuously maintained since 1951 (before SRP startup) to determine the concentrations of radionuclides in a 1200-square-mile area in the environs of the plant and the radiation exposure of the population resulting from SRP operations. The results of this monitoring program are reported annually to the public. This document summarizes the 1979 results. (ERA citation 05:024629)

HRP-0030846/0 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
The Long-Term Effects on Health of Air Pollution.
1978, 49p ICP/CEP-304(4)
Report on a Working Group, Held at Rabka (Poland) on February 9-11, 1977.

Field studies were conducted under the auspices of the World Health Organization to explore the possible impact of long-term exposure to air pollution on health. A meeting was held in Poland in 1977 to review studies of air pollution and its effect on the health of children, assess methods used in these studies, and suggest ways in which additional studies might be undertaken. Field studies in Czechoslovakia, Denmark, the Netherlands, Greece, Poland, Spain, and Yugoslavia, as well as a coordinated respiratory study of the Commission of European Communities, were reviewed. It was determined that, in three countries, a probable association existed between long-term exposure to air pollution and certain respiratory indexes in children. In the remaining countries, study findings tended to be inconclusive. Support was indicated for continued investigation into the health effects of air pollution on children and for providing financial support to conduct studies focusing on both children and the elderly. Supporting data are provided, and additional information on the studies is appended.

N80-27076/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.

Some Problems of Human Adaptation and Ecology under the Aspect of General Pathology.
V. P. Kaznacheyev. Jul 80, 15p NASA-TM-76095 Transl. Into English from Vestn. Akad. Med. Nauk SSSR (USSR), No. 11, Nov. 1979 p 51-57. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The main problems of human adaptation at the level of the body and the population in connection with the features of current morbidity of the population and certain demographic processes are analyzed. The concepts of health and adaptation of the individual and human populations are determined. The importance of the anthropo-ecological approach to the investigation of the adaptation process of human populations is demonstrated. Certain features of the etiopathogenesis of diseases are considered in connection with the population-ecological regularities of human adaptation. The importance of research on general pathology aspects of adaptation and the ecology of man for planning, and organization of public health protection is discussed.

PB80-200108 PC **A08**/MF **A01**
New Hampshire Univ., Durham. Water Resources Research Center.
Factors Regulating Intrazooplankton Predation by 'Polyphemus pediculus'.
Technical completion rept.,
James F. Haney, and Mark T. Mattson. May 80, 168p RR-29, W80-05795, OWRT-A-041-NH(2)
Contract DI-14-31-0001-5029
Prepared in cooperation with New Hampshire Univ., Durham. Dept. of Zoology.

A stratified random sampling design was evaluated in its ability to quantify spatial and seasonal changes in the abundance of the predatory cladoceran, Polyphemus pediculus. Seasonal abundance was typified by an exponential rise to a spring maximum, followed by an exponential decline to a summer plateau, and a final decline to zero in late fall. Changes in seasonal abundance resulted primarily from variation in natality rates of the Polyphemus population associated with alternation between parthenogenetic and gamogenetic reproductive modes. In the spring and fall, the total Polyphemus population was primarily littoral, and in the summer it was also limnetic in distribution, although mean density was always greatest in the littoral. Diel changes in population distribution also occurred, and the population was aggregated at the lake surface in the day and dispersed horizontally and vertically in the epilimnion at night. Daytime patch location was highly correlated with wind direction, and patch configuration was dependent on the type of Polyphemus (sexual or asexual) present. A compartment model is proposed to explain the relationship between patch formation and biological and environmental factors. A deterministic computer model was used to estimate the predation impact of the Polyphemus population on nauplii and Chonochilus. Maximum spring mortality rates for these prey were 8-11/day.

PB80-200439 PC **A03**/MF **A01**
Aerospace Corp., Los Angeles, CA.
Preliminary Information: Volcanic Ash Problems and Concerns for Fish and Wildlife.
Interim rept.
Jun 80, 43p FWS/OBS-80/38
Contract DI-14-16-0009-78-981
Prepared in cooperation with Argonne National Lab., IL.

Effects on fish and wildlife by volcanic ash left in the wake of the Mt. St. Helens eruption have only begun to be documented. Possible detrimental impacts include loss of forage from smothering by ash, impedance of wildlife movements by ash-created barriers, and reduction in fish numbers due to destruction of fish larvae and stream habitats. This publication makes no attempt to assess the extent of these and other effects, rather it presents ecological problems and benefits from 5 main options for dealing with ash deposits: taking no action to remove the ash, clearing pathways, stabilizing the ash in-place, local storage, and complete removal. Also discussed are pros and cons of choices for final disposal of accumulated waste. Various physical properties of volcanic ash are also discussed.

6H. Food

AD-A085 876/1 PC **A10**/MF **A01**
Army Natick Research and Development Command MA
USAF Food Habits Study. Part I. Method and Overview.
Technical rept.,
Kerry W. Wyant, Herbert L. Meiselman, and Day Waterman. Oct 79, 206p Rept no. NATICK/TR-79/041

Two data collection efforts at Travis AFB were undertaken to provide minority food preference and weight gain data to Air Force menu planners and individuals interested in the issues concerning body weight. White males, white females, black males and black females were administered a new Food Preference Survey (FPS), a Food Selection Questionnaire (FSQ), and two kinds of arguments that conveyed nutritional information and encouraged either the inclusion or exclusion of certain food from a meal. Provided in the present report are basic food preference data, validity and reliability data, and the results of the nutritional information experiment. Foods are ranked by decreasing hedonic mean and by decreasing frequency mean for each of the subpopulations, and the results of an analysis of variance on each the 194 foods are given. Foods in the analysis are arranged by overall decreasing hedonic mean and 31 food groups, thus permitting easy access by menu planners. The FSQ was found to be a valid instrument for assessing food selection and a moderately valid instrument for assessing the number of portions selected. The FPS was found to be moderately valid but highly reliable. Results are interpreted in light of the large number of variables that were not controlled. The selection of carrot sticks was increased either by argumentation or by making personnel aware that the item was available. Arguments encouraging the exclusion of desserts from a meal had no effect. Detailed analyses of food preferences and weights of personnel are reserved for later reports. (Author)

AD-A086 063/3 PC **A02**/MF **A01**
Armed Forces Inst of Pathology Washington DC
Army Medical Research & Development Technical Report.
Annual progress rept. 1 Oct 78-30 Sep 79.
1 Oct 79, 9p

The research project reported in this Progress Report is as follows -- Project: Lesions in Animals Fed Enzyme Inactivated Frozen and Irradiated Meats. (Author)

CEA-CONF-4322 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Biologie.
Food irradiation.
J. Raffi, and L. Saint-Lebe. 1977, 11p
In French.
U.S. Sales Only. Microfiche copies only.

The first part of this data is relative to the study of chemical modifications induced by gamma radiations (exp 60 Co, exp 137 Cs) on macromolecules of food and their contaminates with the help of two examples: starch and nucleic acids. Then the second part shows what are the consequences of irradiation on food and their preservation; we make distinction between useful effects (for instance germination inhibition of tubercules, destruction of insects or micro-organisms) and the results which are contingently bad for nutritional, technological and above all toxicologic aspects. The last part is relative to a short restatement of the problems inherent in the industrialization of this treatment. (Atomindex citation 11:499713)

PB80-197403 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Food Economics Inst.
USDA Nutrient Data Base for Individual Intake Surveys, Release 1.
Data file,
Eleanor Pao, and Brucy Gray. Mar 80, mag tape USDA/DF-80/006
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190226.

Nutrient data base of approximately 4,500 food items developed for the USDA nationwide Food Consumption Survey 1977-78. Only items reported in the survey are included. Foods reported exclusively in the Puerto Rican phase of the survey are not included but are available on a supplemental tape. Food composition values are for 100-gram edible portions of food, as eaten, for energy (kilocalories), protein (g), fat (g), carbohydrate (g), calcium (mg), iron (mg), magnesium (mg), phosphorus (mg), vitamin A value (I.U.), thiamin (mg), riboflavin (mg), niacin (mg), vitamin B6 (mg), vitamin B12 (mcg), and vitamin C (mg). For milk and milk products a calcium conversion factor is provided which converts each product to an equivalent weight of whole milk based on its calcium content relative to whole milk. Food items reported in the survey but not specifically described are assigned nutrient values for a commonly eaten form of the food or for a composite of seveal forms. Food values for mixtures or recipes are based on popular recipes, commercial products, or composites of several products. A food code maual is provided which includes, for each item, a unique seven-digit food code, description of food, and commonly reported household measures with their weights in grams. The first digit of the code denotes one of nine major food categories. A tenth category of miscellaneous items used in small amounts, assigned a first digit of zero, does not appear on the tape except for soy sauce.

PB80-197411 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Food Economics Inst.
Data from Household Food Consumption Survey (1977-78) (Summer Quarter).
Data file,
Brucy C. Gray, and Mary Hama. 20 Jun 80, mag tape USDA/DF-80/007
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190180.

This file contains food and nutrient data of 3475 households of which approximately 94 percent (3266) are housekeeping households for summer from the USDA 1977-78 Nationwide Food Consumption Survey collected during April 1977 through March 1978. Sample design provided for a national basic sample. When the weights are applied, the total summer weighted samples are 3515 interviews. The data were collected by personal interviews with household member most knowledgeable about the household for food consumption. A food list was used to help recall kinds, quantities (converted to pounds), and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat carbohydrate, calcium, iron, magnesium, phosphorous, vitamin A value, thiamin, riboflavin, niacin, vitamin B12, vitamin B6, and ascorbic acid. Other information includes household sizes of equivalent nutrition units, nutritive values per nutrition unit, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Households income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of food.

PB80-197429 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Food Economics Inst.
Food Intake of Individuals, Summer Basic, 1977-78.
Data file,
Brucy C. Gray, and Eleanor Pao. 15 May 80, mag tape USDA/DF-80/008
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track re-

cording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190226.

This file contains food and nutrient intake for 11,503 men, women, and children (weighted on household and age basis, 6,591 individuals, unweighted) collected in 48 conterminous states of U.S. in summer 1977, as part of Nationwide Food consumption Survey 1977-78. The interview was conducted in the home with each eligible individual (half of the individuals over 18 years were systematically omitted) asked to recall his previous day's diet and then to keep a diet record for the next 2 days which the interviewer returned to review and pick up. Information was gathered on all days of the week including Saturday and Sunday. Data included names for each eating occasion, time, and person(s) sharing it, and if eaten away from home, where eaten, type of service, and cost. For each food and beverage, the kind and quantity (grams) are given and whether from home supplies or obtained away. Data given on vitamin and mineral supplements taken, frequency of consuming organ meats during previous 30 days, whether person is a vegetarian and if so, type of foods eaten, whether person is on a diet, whether diet was typical, and self-appraisal of health status. Characteristics available for each individual are sex, age, race, if Spanish descent; estimated height and weight; pregnancy and lactation status for women; household income before taxes (category): household size; and education, occupation, and employment status of male and female heads. Nutrient content of each food, each day's intake, and 2 or 3 day average intakes are available for energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, preformed niacin and vitamins B6, B12, and C.

PB80-201049 PC **A03**
New York Sea Grant Inst., Albany.
Reclamation and Treatment of Clam Wash Water,
R. R. Zall, L. F. Hood, W. J. Jewell, R. L. Conway, and M. S. Switzenbaum. Dec 76, 28p NYSG-RR-80-08, NOAA-80052803
Pub. in Proceedings of National Symposium on Food Processing Wastes (7th), Environmental Protection Technology Series EPA-600/2-76-304, 25p Dec 78.

Waste generated from food processing activities becomes troublesome and difficult to handle. The organic material wasted from clam processing sites place a burden on sewage systems. If discharged without treatment, it probably pollutes waters near the coast where these types of plants operate. The purpose of this project was to assist the clam processing industry in developing methods to create salable products from sewage where the economics of waste handling might be turned into a credit rather than debit to the industry.

PB80-201064 PC **A02**
New York Sea Grant Inst., Albany.
Changes in Lipid Composition of Cooked Minced Carp '(Cyprinus carpio)' during Frozen Storage,
J. Mai, and J. E. Kinsella. 1979, 9p NYSG-RR-80-12, NOAA-80052805
Pub. in Jnl. of Food Science, v44 n6 p1619-1624 1979.

Minced carp tissue was cooked by baking and deep-fat frying and stored at -18C for periods up to 8 weeks. Phospholipid (PL) levels decreased whereas free fatty acids (FFA) increased during frozen storage of all samples. Samples treated with antioxidants gave significant higher values for FFA compared to the controls. Thiobarbituric acid (TBA) values were higher in the cooked samples compared to the raw samples. Samples without antioxidants had considerably higher TBA values than those containing antioxidants. The carbonyl content of the samples fluctuated during storage. There was no significant change in the composition of the fatty acids during storage.

PB80-201098 PC **A02**
New York Sea Grant Inst., Albany.
Preparation and Properties of Dehydrated Clam Flavor from Clam Processing Wash Water,
Y. Jon, and L. F. Hood. 1979, 7p NYSG-RR-80-09, NOAA-80052802
Pub. in Jnl. of Food Science, v44 n6 p1612-1614 1979.

Surf clam wash water was concentrated and dehydrated in order to convert it to a marketable clam flavor ingredient (CFI). Concentration by boiling to 2% solids and freeze drying with 4.6% dextrin yielded the best product. Ultrafiltration, and spray- and drum-drying were also evaluated. CFI had acceptable dispersibility, solubility, and color. Quality did not deteriorate during 90 days storage. Addition of 0.5% CFI to seafood chowder improved the overall acceptability of the chowder.

PB80-204431 PC **A02/MF A01**
New York Sea Grant Inst., Albany.
Canned Fish Bites in Tomato Sauce.
Booklet,
R. C. Baker, and J. M. Darfler. May 80, 22p NYSG-B-7, NOAA-80052806

Meatballs in tomato sauce are a popular and accepted canned convenience product. Since small bite-sized portions of a fish mixture in a creamy sauce had been found to be an acceptable product (Creamy Fish Bites), the authors developed a canned fish bite in tomato sauce. Several species of fish and several combinations of fish with meats were compared with fish bites made from minced white sucker.

6J. Industrial (Occupational) Medicine

HRP-0902163/5 PC **A02/MF A01**
Western Center for Health Planning, San Francisco, CA.
Planning for Occupational Health. Part I: Background and Trends,
Vivian Lin, and Andrea Rosen. 13 Mar 80, 16p TECHNICAL ASSISTANCE MEMO-49
Contract PHS-HRA-232-79-0037
See also Part 2, HRP-0902164.

Occupational health is described as a significant element in the plans and programs being developed by the Health Systems Agencies. Implementation of such programs has the potential to reduce health hazards and improve community health status; reduce health care cost; identify occupational health issues and approaches to control hazardous exposures; and achieve the support of providers, industry, and labor. Disease can be reduced through identification and elimination or modification of workplace hazards, thus decreasing the demand for medical services. The report points out that 3.7 million persons required medical treatment in 1976 as a result of work related injuries and that in 1975 there were 12,600 deaths due to occupational disease. Examples of environmental hazards which have had an effect on various communities are cited. A brief history of occupational health is provided. Some of the well-known health problems, such as black lung and lead poisoning, are included, as well as some of the new hazards which have evolved as a result of new technology and job-related stress. A list of references (some considered essential for health planning) is provided.

HRP-0902164/3 PC **A02/MF A01**
Western Center for Health Planning, San Francisco, CA.
Planning for Occupational Health. Part II: Methods and Strategies for HSAs,
Vivian Lin, and Andrea Rosen. 13 Mar 80, 16p TECHNICAL ASSISTANCE MEMO-50
Contract PHS-HRA-232-79-0037
See also Part 1, HRP-0902163.

Occupational health can become an integral part of the functions of the Health Systems Agencies. As the incidence of occupational illness increases, so do the health care costs. In their efforts to contain costs of health care, and to improve health services and the health status of area residents, the HSAs have many opportunities for incorporating occupational health into all areas of health planning. Preventive measures, such as the elimination or reduction of workplace hazards, screening programs, and programs to monitor conditions, are stressed. Ways in which occupational health can be incorporated in the review process are mentioned. HSAs are urged to increase the involvement of communities, labor unions, and employers in their activities. The agencies should also sponsor educational events designed to increase public awareness of occupational problems. Essential steps in planning for occupational health include: assembling employee profiles of the area; identifying the most hazardous industries and their major problems; analyzing morbidity and mortality data; identifying the target population in the greatest need; and developing strategies for reducing problems. Examples of what some HSAs have done to improve occupational safety and health are cited, and recommended actions are provided.

ORO-5366-T2 PC **A08/MF A01**
Kaiser Engineers, Oakland, CA.
National Waste Terminal Storage Repository in a Bedded Salt Formation for Spent Unreprocessed Fuel. Occupational Exposure and Health Physics Studies. KE Report No. 78-21-R.
Sep 78, 174p
Contract EY-77-C-05-5366

This report includes the Occupational Exposure and Health Physics studies of the National Waste Terminal Storage Repository Number 2 (NWTSR2). Section 1 deals with occupational radiation exposures. The results of dose equivalent and dose commitment calculations are summarized. The man-rem total is a summation of all doses to all personnel throughout a year. It would have to be divided by the number of total personnel involved, to obtain an average annual dose per person. Section 2 presents the occupational exposures due to nonradiological pollutants. The activities of workers and the equipment used during the construction, storage/retrieval and decommissioning of the facility are outlined. Tabulations are presented of the substances (dusts, fumes, gases and vapors) and physical agents (heat, vibration, and nonionizing radiation) to which personnel will be exposed in various surface and underground work areas during construction and decommissioning, and during storage and retrieval operations. Some significant nonradiological occupational exposures are summarized. Section 3 outlines the health physics program for the NWTSR2 facility. It is important to initiate the health physics program one or two years before the facility is placed in operation to establish the radiation background levels at the site and its surrounding area, and to collect environmental samples, both on-site and off-site, prior to waste storage and retrieval operations. The health physics organization consists of 15 persons, including five health physicists. (ERA citation 05:023734)

PB80-196439 CP **T02**
Bureau of Labor Statistics, Washington, DC. Office of Occupational Safety and Health Statistics.
Supplementary Data System, Microdata File, California, 1978.
Data file,
Norman Root, and Chris Kirsch. 1978, mag tape BLS/DF-80/023
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-149982.

Tape contains records of individual occupational injuries and illnesses. Selected injury and illness factors were classified in accordance with standard definitions used in the Supplementary Data System of the Bureau of Labor Statistics. Each case record contains year and month of occurrence; nature of injury or illness, part of body affected, type of accident or exposure, and source of injury or illness; occupation, industry, age, sex, and length of service of injured or ill employee; and extent of disability (supplied for fatalities only). Technical documentation is available: PB80-149982, Supplementary Data System, Microdata Files, User's Guide, 1978-79. Data were compiled by the California Department of Industrial Relations from records of workers' compensation cases involving fatalities, or one or more lost work-

days, which were reported during 1978. Data include cases arising in private and public employments with the exception of some domestic servants, casual employees, part-time gardeners, volunteer or charitable workers, and uncompensated athletes. In addition, Federal, railroad and maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-196702 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-110-585, Piper Aircraft Corporation, Vero Beach, Florida,
G. E. Burroughs. Apr 79, 19p NIOSH-HE-78-110-585

Personal and area environmental samples were collected, and a walk through survey and interviews were conducted at the request of an authorized employee representative to determine if workers at the Piper Aircraft Facility (Standard Industrial Classification 307) in Vero Beach, Florida were exposed to potentially toxic substances. Approximately 150 employees in two departments who work with acrylonitrile butadiene styrene (9003569) plastic or use a resin fibrous glass buildup technique were studied. Short term styrene (100425) concentrations exceeded OSHA criteria of 100 parts per million (ppm) for an 8 hour time weighted average (TWA). One of 13 long term samples for styrene was measured at 293ppm, which was above the recommended OSHA standard of 200ppm. Concentrations of methyl alcohol (67561)(0.3 to 0.7ppm), acetone (67641)(7 to 117ppm), trichloroethylene (79016)(1.2 to 3 ppm), butadiene (106990)(0.7 to 1.3ppm), total particulates (0.4 to 7.3 milligrams per cubic meter, mg/cu m), and acrylonitrile (107131)(0.8 to 1.4ppm) were below recommended OSHA maximum concentrations of 200ppm, 1,000ppm, 100ppm, 1,000ppm, 15mg/cu m, and 20ppm, respectively. Evaluation results indicate that some employees were exposed to potentially toxic short term concentrations of styrene. The author recommends the addition of local exhaust ventilation, a review of the effectiveness of existing ventilation systems, and maintenance of work practices that include the use of gloves and skin lotion to reduce skin dryness and irritation.

PB80-196736 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-131-586, Goodyear Tire and Rubber Company, Niagara Falls, New York,
Richard M. Taft, and Raymond E. Stroman. Apr 79, 15p NIOSH-HE-78-131-586

Environmental sampling and medical evaluations were conducted at the Goodyear Tire and Rubber Company (Standard Industrial Classification 301), Niagara Falls, New York, on October 25 and 26, 1978 to evaluate exposure among workers in the drying and bagging department to 4-morpholinyl-2-benzothiazole disulfide (95329) (Kagarax-A). The Safety Committee Chairman of the Oil, Chemical and Atomic Workers International Union, reported that 19 employees were exposed to an irritating chemical substance, and that 68 cases of dermatitis had been reported in the past 5 years. Personal and area air sample concentrations for morpholine (110918) were below the environmental criteria of 20 parts per million. Samples for 2-mercaptobenzothiazole (149304) (MBT) were below the analytical limit of detection (0.035 milligrams per cubic meter, based on a 60 liter air sample). Wheal type lesions were found among workers due to skin contact with Kagarax-A. The investigators conclude that some workers may have become sensitized to the allergenic component (MBT) of Kagarax-A. Investigator recommendations for minimizing employee exposure to the chemical and preventing adverse health effects include: employee education; personal hygiene; use of laundry and eyewash facilities, personal protection equipment, and protective creams; improved housekeeping; physical examinations; and reporting of all cases of dermatitis to employee supervisors.

PB80-197445 CP **T02**
Bureau of Labor Statistics, Washington, DC. Office of Occupational Safety and Health Statistics.
Supplementary Data System, Microdata File, Indiana, 1978.
Data file,
Norman Root, and Chris Kirsch. 1978, mag tape BLS/DF-80/024
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-149982.

Tape contains records of individual occupational injuries and illnesses. Selected injury and illness factors were classified in accordance with standard definitions used in the Supplementary Data System of the Bureau of Labor Statistics. Each case record contains year, month and day of occurrence; and time of accident; nature of injury or illness, part of body affected, type of accident or exposure, and source of injury or illness; occupation, industry, age, sex, length of sevice, and weekly wages of injured or ill employee. Technical documentation is available: PB80-149982, Supplementary Data System, Microdata Files, User's Guide, 1978-79. Data were compiled by the Indiana Industrial Board from records of workers' compensation cases which were reported during 1978. Data include cases arising in private and public employments with these principal exceptions: Agricultural employees, domestic servants, casual employees, and executive officers of nonprofit corporations for whom coverage is voluntary. In addition, Federal, railroad and maritime employments are not covered by the State act and cases involving such employees are not included in these data.

PB80-198377 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report HE 78-13-577, Equitable Bag Company, Inc., Florence, Kentucky.
Apr 79, 16p NIOSH-HE-78-13-577

Environmental sampling, analysis of wet stock paper, confidential employee interviews, observation of work practices, and a review of the workplace and materials used wire conducted to evaluate the possible exposure of 20 employee to formaldehyde (5000) at the Equitable Bag Company, Incorporated (Standard Industrial Classification 7399) in Florence Kentucky. The request was made by an authorized employee representative and the evaluation was performed on January 12, August 10 and 16, and September 20, 1978. Personal and area samples were analyzed for formaldehyde, acetaldehyde (75070) and valeraldehyde (110623). Propionaldehyde (123386) and butyraldehyde (123728) content also was measured. Personal and area samples for formaldehyde ranged from 0.14 to 0.09 parts per million (ppm), and were below the OSHA 8 hour time weighted average exposure limit of 3ppm. Environmental samples for total aldehydes were below the analytical limits of detection. During medical interviews, workers complained of respiratory and eye irritations, chest discomfort, and dermatitis. The reports of symptoms were more common during the summer months. The author concludes that a potential for excessive formaldehyde exposure did exist especially during warm weather and recommends that a maximum number of exhaust fans be used during periods of elevated temperatures, additional ventilation be installed at locations where wet stock paper is processed or stored, periodic sampling be conducted to prevent overexposures to formaldehyde, and precautions be taken to avoid needless environmental contamination from bags of lead chromate pigment stored in the facility.

PB80-198393 PC **A04/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report HE 77-98-587, Du Co Ceramics Company, Saxonburg, Pennsylvania.
Apr 79, 66p NIOSH-HE-77-98-587

Interviews, preliminary and follow up medical examinations of 150 persons, and area air sampling were conducted on September 8 and 9, 1977 and March 14 to 17, 1978 to determine ceramic worker exposures to free crystalline silica (14808607), asbestos (1332214), and total respirable dust at the Du Co Ceramics Company (Standard Industrial Classification 3292) in Saxonburg, Pennsylvania. The request came from an authorized representative of Local 8042, United Steelworkers of America to evaluate potential health problems. Several samples in each area of the facility exceeded OSHA standards for acceptable exposure to respirable crystalline silica (10 milligrams per cubic meter divided by the percentage of quartz plus 2) and respirable dust (5 milligrams per cubic meter). Four out of five asbestos samples exceeded the recommended OSHA limit of 0.1 fibers per cubic centimeter. Chest x-rays revealed few cases of radiologic abnormalities, a low incidence of chronic bronchitis and restrictive pulmonary dysfunction, and some obstructive ventilatory dysfunction. Bronchitis occurred primarily in women, and smokers were vulnerable to ventilatory dysfunction. A potential health hazard was confirmed for workers in granule mixer, batch scale, lancaster mill, rouse mill, and blow off operations. The authors' recommendations include annual medical examinations that include x-rays and pulmonary function tests; reassignment of workers with suspectd abnormalities; ventilation and other engineering improvements in the mixing ball mill, spray dry cutting, sagger filling, and machining departments; use of respiratory and personal protective clothing and goggles; and provision of shower facilities.

PB80-198955 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report HE 79-47-582, Gladnick Dental Clinic, Wilmington, Delaware,
Paul L. Johnson. Apr 79, 11p NIOSH-HE-79-47-582

Breathing zone and general area samples were collected to detect inorganic mercury (7439976) concentrations at the Gladnick Dental Clinic (Standard Industrial Classification 80) in Wilmington, Delaware on February 27, 1979. The request came from the clinic to evaluate the potential health hazards to four employees from inorganic mercury. Concentrations were detected by mercury vapor badges attached to uniform lapels and by charcoal tube samples for mercury vapor. Personal samples for mercury exposure were analyzed based on the reduction in conductivity of the resulting amalgam absorbed, and the general area samples were analyzed by atomic absorption spectroscopy. Areas of concentration were detected by the Mercury Sniffer. The OSHA standard of 0.1 milligrams per cubic meter (mg/cu m) for mercury exposure was exceeded only when the lid was removed from the mercury scrap storage container (range 0.4 to 0.75 mg/cu m). The investigator determined that clinic workers normally were not exposed to potentially toxic airborne concentrations of inorganic mercury. Recommendations resulting from the evaluation include the introduction of improvements in mercury scrap storage and workplace hygiene, instruction of workers concerning mercury waste disposal and decontamination procedures, and examination of American Dental Association recommendations for reducing employee mercury exposures.

PB80-199268 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 79-8-584, Stauffer Chemical Company, Silver Bow, Montana,
Bobby J. Gunter. Apr 79, 16p NIOSH-HE-79-8-584

Environmental evaluations were conducted on December 19 to 21, 1978, at the Stauffer Chemical Company (Standard Industrial Classification 5161) in Silver Bow, Montana in response to a request from Teamsters Local Number 2 in Butte, Montana, to determine potential toxic exposures associated with the processing of ore and the production of elemental phosphorus (7723140) (P4) among 75 to 80 workers. Breathing zone and general room air samples were analyzed for phospho-

rus pentoxide (1314563) (P205), elemental phosphorus, crystalline silica (7631869), total particulate, fluoride, and vanadium pentoxide (1314621). Concentrations of P205 ranged from 1.7 to 9.2 milligrams per cubic meter (mg/cu m). No OSHA criteria currently exists for this compound. In 3 out of 4 respirable crystalline silica samples, concentrations ranging from 0.09 to 0.183mg/cu m exceeded the OSHA standard of 10mg/cu m divided by the percent of respirable quarts (1480607) plus 2. All other samples were within the most recent evaluation criteria. The author concludes that a potential health hazard from excessive airborne concentrations of P205 and respirable crystalline silica existed and recommends maintaining the current respirator program, insuring proper fit of respirators, briefing workers on potential hazards, and improving local and general ventilation.

PB80-199284 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-113-589, Hopkins Agricultural Chemical Company, Atlanta, Illinois,
Charles Jeff Bryant, and Theodore W. Thoburn.
Apr 79, 11p NIOSH-HE-78-113-589

Breathing zone and general area samples for Counter 15-G (13071799) insecticide, respirable particulates, total particulates, and respirable free silica were collected, and 21 employees were interviewed at the Hopkins Agricultural Chemical Company (Standard Industrial Classification 287) in Atlanta, Illinois on January 9 to 11, 1979. An authorized employee representative requested the evaluation to asses toxic exposures of 10 to 20 employees. Gas chromatographic sample analysis revealed that all contaminants were below OSHA criteria for crystalline silica, and respirable and total particulates (10 milligrams per cubic meter divided by the percentage of quartz plus 2, 5 milligrams per cubic meter, and 15 milligrams per cubic meter respectively). No standard exists for exposure to the insecticide, but measured concentrations were low (0.002 to 0.011 milligrams per cubic meter). The authors conclude that no health hazard to workers existed at the time of the evaluation and recommend enclosure of local exhaust ventilation hoods, use of personal protective equipment to prevent oral and eye exposures, and continuation of a program of cholinesterase monitoring.

PB80-199508 PC **A11**/MF **A01**
Alaska Div. of Occupational Safety and Health, Juneau.
Division of Occupational Safety and Health (DOSH) Compliance Manual.
24 Jul 73, 236p

The Alaska State Legislature enacted Occupational Safety and Health legislation which was signed by the Governor on April 23, 1973 and became effective on July 24, 1973. The legislation prescribed that a program be undertaken to minimize work-related personal, injuries and illnesses which impose a burden upon, and are a hindrance to, the people of the state in terms of loss of production, wage loss, medical expenses and disability compensation payments. The Division of Occupational Safety and Health (DOSH) operations manual provides guidance and information for administration of the state safety and health program. The instructions and procedures contained within this manual will be followed by DOSH field personnel to assure the effective and uniform implementation of the program.

PB80-199912 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Physical Sciences and Engineering.
Control Technology for Worker Exposure to Coke Oven Emissions.
Technical rept.,
John W. Sheehy. Mar 80, 37p DHEW/PUB/NIOSH-80-114

Numerous studies have shown 'coal tar' products increase the risk of skin and lung cancer. One study showed top side coke oven workers had a lung mortality rate of 10 times that of all steel workers. Another study showed that men employed at coke ovens for more than five years showed a mortality rate 3.5 times the expected rate. In view of this significant health hazard to thousands of coke oven workers a NIOSH in-house study to assess coke oven control technology was performed. Control technology for coke ovens was assessed through visits to seven United States coke oven plants with state-of-the-art control technology and by a review of current coke oven control technology literature. Each control method is briefly described and the effectiveness of import engineering and work practice controls is presented. The report discusses, separately, controls for charging emissions, pushing emissions, door emissions, and top side leaks.

PB80-200637 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Hazard Evaluation and Technical Assistance Report No. TA 79-15, Dulles International Airport, Washington National Airport, Washington, DC.,
R. W. Gorman. Apr 79, 40p NIOSH-HE/TA-79-15

Atmospheric sampling was performed on January 15, 1979 in the Dulles International and the Washington National Airports (Standard Industrial Classification 4583) to determine if asbestos (1332214) fibers from ceilings were being released into the air. The evaluation request came from the Federal Aviation Administration following adverse media publicity about an operation on the vocal chords of an airline employee. Ceiling samples were analyzed at 40 to 50 percent and 1 to 2 percent chrysotile (12001295) asbestos for the Dulles and National Airports, respectively. No detectable airborne concentrations were found at either airport. Complaints of throat irritations at Dulles Airport were attributed to low humidity (13 to 16 percent). The author recommends periodic monitoring of ceiling stability, investigation of sealant applications, replacement of vent duct wrapping, and provision of dry throat soothers for employees.

6K. Life Support

AD-A085 821/7 PC **A03**/MF **A01**
Sea-Space Research Co Inc Harvey LA
Analysis of Decompression Tables Calculated by Non-U.S. Navy Methods,
Peter O. Edel. 31 Mar 80, 34p
Contract N00014-78-C-0347

A total of 336 depth-time combinations of air decompression tables selected from U. S. Navy and British schedules were individually analyzed by a computer using the AUTODEC system. In addition 97 schedules tested by the Experimental Diving Unit in the development of Mixed Gas Scuba tables were analyzed to compare the computer analysis with manned test data. (Author)

AD-A086 029/6 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
External Work of Breathing of Demand-Air Underwater Breathing Apparatus,
J. J. Grodski. 1978, 8p Rept no. DCIEM-PUB-78X18
Availability: Pub. in Oceans 78, International Combined Conference (4th), p115-121, 6-8 Sep 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 030/4 PC **A02**/MF **A01**
Navy Experimental Diving Unit Panama City FL
MK 12 SSDS Helmet Adjustable Exhaust Valve Assembly Evaluation.
Test rept.,
M. A. Coulombe. 24 Mar 80, 18p Rept no. NEDU-8-80

Failure of the tempered spring stop pin in the helmet adjustable exhaust valve assembly of the Mk 12 SSDS has required further evaluation of existing and proposed exhaust valve configurations. Test results indicate the adoption of recommended retrofit and design change proposals. (Author)

6L. Medical and Hospital Equipment

FRNC-TH-827 MF **A01**
Grenoble-1 Univ. (France).
Contribution to the Study and Design of a Photodetector with a Semi-Conducting Target.
These (3e Cycle),
Naima Harabida. 1978, 126p
In French.
U.S. Sales Only. Microfiche copies only.

The study of a medical camera is described in the first chapter together with the reasons for employing a single cell as fast photomultiplier. In the second chapter are described the various existing photomultiplier tubes, the P.M. proposed for study and its anticipated characteristics. The third chapter is devoted to the search for a geometrical structure suitable for focusing electrons and for the optical inlet of the photomultiplier. The characterization of the semiconductor material used, as well as its electron detection qualities is the subject of the fourth chapter, a study of the electron-matter interactions being described first. The study and making of the photosensitive coats are presented in the fifth chapter, this study covering the research work on an evaporation method accessible to a study laboratory. (Atomindex citation 11:500352)

PATENT-4 207 889 Not available NTIS
Department of the Air Force Washington DC
Injection System for Suspension and Solutions.
Patent,
Clarence M. Oloff, Willi J. Buehring, and Kevin J. Greenlees. Filed 27 Oct 78, patented 17 Jun 80, 6p AD-D007 380/9, PAT-APPL-955 296
Supersedes PAT-APPL-955 296-78, AD-D005 589.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An injection System for suspensions and solutions having five cartridges supported on a cartridge support. The cartridges are connected to a coalescing disc with five inlet passages and a single output passage with a feed line connected to the single passage. Suspensions and solutions supplied to the cartridges are selectively injected into a test subject by supplying a saline solution to the cartridge from a syringe pump through a selector which selects the cartridge to which the saline solution is supplied. (Author)

PB80-197478 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
X-Cal - A Calibration System for Electrical Measurement Devices Used with Diagnostic X-Ray Units.
Final rept.,
Ronald H. McKnight, and Robert E. Henber, Jr.
Jun 80, 78p NBSIR-80-2072

The X-CAL high-voltage-divider calibration system was designed to calibrate the direct and alternating voltage measurement capabilities of commercial high voltage dividers used to characterize diagnostic x-ray units. In addition, there is capability for determining the frequency response of these dividers and for the calibration of the filament current and anode current measurement features of specific commercially-available devices. The calibration system combines in a single unit a range of capabilities which allows calibration of a device under test to be accomplished with a minimum of set up time. This report gives a description of the motivation for, the operation of and the design details of the X-CAL system. It lists the specified accuracies and the ranges of applicable parameters of the various subsystems, describes the five different calibrations which can be performed using the X-CAL system, discusses techniques used in the original calibration of the X-CAL system itself, and contains the basic circuit diagrams for the system.

6M. Microbiology:

AD-A085 926/4 MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD

Group 6M—Microbiology:

Mitogenic Activity of Staphylococcal Exfoliative Toxin.
Interim rept.,
Beverly A. Morlock, Leonard Spero, and Anna D. Johnson. 2 Jun 80, 20p
Availability: Microfiche copies only.

Exfoliative toxin from Staphylococcus aureus was mitogenic for murine spleen cells. It was primarily active on T lymphocytes but also significantly stimulated B-cells from the spleens of 'nude' mice. The mitogenicity was not affected by simple sugar or alpha-methyl pyranosides. N-acetyl glucosamine and N-acetyl galactosamine inhibited its effect. Exfoliatin was as powerful a mitogen as the enterotoxins of S. aureus. Some significant differences between the mitogenic activity of the two toxins were demonstrated. (Author)

AD-A086 033/8 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Commonality of a Virulence Factor among Yersinia Species,
Daniel N. Harrison, Walter Laird, David M. Robinson, and Dan C. Cavanaugh. 1979, 3p
Pub in Jnl. of Infectious Diseases, v141 n3 p413 May 80.

No abstract available.

PAT-APPL-6-050 407 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Selective Screening Methods for Selecting and Identifying Hyper-Cellulolytic Microbial Mutants; Hyper-Cellulolytic Mutant Microorganisms; and Processes for Their Utilization.
Patent Application,
B. S. Montenecourt, and D. E. Eveleigh. Filed 20 Jun 79, 61p
Contract ET-78-S-02-4591
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A process for identifying and selecting microorganism strains, e.g., of the Trichoderma reesei species is described. Various hyper-cellulolytic characteristics, as described in greater detail, conducting one or more of various mutation and selection steps in any order or sequence followed by a mutation and selection step for microbial strains with constitutive cellulolytic activity by culturing in this latter step the microbial strains on a general non-enzyme-inducing culture medium and then detecting constitutive mutant microbial strains by overlayering with a culture medium that will detect cellulase and cellobiase activity with the proviso that any further protein synthesis is inhibited is disclosed. The selection process is useful for identifying and selecting microbial strains with the ability to produce various enzymes capable of breaking down various cellulosic and cellobiosic materials into smaller sugar units, e.g., glucose units, which can be subsequently used for the production of alcohol and other organic chemicals in a conventional fermentation process under anaerobic or aerobic conditions. Various novel mutant strains of Trichoderma reesei developed and selected using the approach above and their use in producing enzymes and hydrolysis of cellulosic materials are disclosed. (ERA citation 05:026384)

PATENT-4 204 037
Not available NTIS
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Method and Automated Apparatus for Detecting Coliform Organisms.
Patent,
W. P. Dill, R. E. Taylor, and E. L. Jeffers. Filed 4 Apr 78, patented 20 May 80, 14p N80-27067/1, PAT-APPL-893 657
Supersedes PAT-APPL-893 657-78. Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Method and automated apparatus are disclosed for determining the time of detection of metabolically produced hydrogen by coliform bacteria cultured in an electroanalytical cell from the time the cell is inoculated with the bacteria. The detection time data provides bacteria concentration values. The apparatus is sequenced and controlled by a digital computer to discharge a spent sample, clean and sterilize the culture cell, provide a bacteria nutrient into the cell, control the temperature of the nutrient, inoculate the nutrient with a bacteria sample, measures the electrical potential difference produced by the cell, and measures the time of detection from inoculation.

PB80-201296 PC **A02**
Texas A and M Univ., College Station. Sea Grant Col. Program.
Stability of Simian Rotavirus in Fresh and Estuarine Water,
Christon J. Hurst, and Charles P. Gerba. Jan 80, 7p TAMU-SG-80-814, NOAA-80052709
Grant NOAA-04-7-158-44105
Pub. in Applied and Environmental Microbiology, v39 n1 p1-5 Jan 80.

The rates of inactivation of poliovirus 1, echovirus 7, coxsackievirus B-3, and simian rotavirus SA11 were compared in polluted and nonpolluted fresh and estuarine water samples. The study was done in two parts, comparing virus survival in samples taken 1 year apart from the same sites. The survival studies were performed at 20C and at the natural pH of the water samples. In the first part of the study, the time required for a 3-log10 reduction in the initial virus titers was 2 to 3 days in the estuarine water samples and varied from 3 to 14 days in the freshwater samples. In the second part of the study, no clear distinction was found between survival of viruses in freshwater samples and survival in estuarine water samples. This indicates that there is a nonseasonal change in factors in the water which affect virus survival.

6N. Personnel Selection and Maintenance (Medical)

AD-A086 147/6 PC **A03**/MF **A01**
Advanced Research Resources Organization Washington DC
Physical Performance Standards for Army Jobs: Procedures Manual.
Research product rept. 28 Dec 78-30 Jan 80,
David C. Myers, Deborah L. Gebhardt, and Edwin A. Fleishman. May 80, 48p ARI-RP-80-5B
Contract MDA903-79-C-0093

This manual outlines a procedure for determining the physical ability requirements of Army jobs, without requiring a great deal of time and effort on the part either of analyst personnel or job incumbents. The manual is arranged in three sections: (1) task analysis, (2) physical abilities analysis, (3) data analysis and presentation of results. Each section describes in detail the steps necessary to carry out this scaling of physical task demands, for which research has indicated acceptable reliability. (Author)

6O. Pharmacology

AD-A086 044/5 PC **A03**/MF **A01**
Israel Inst for Biological Research Ness Ziona
Sugar Oximes Potential Antidotes against Organophosphorus Poisoning.
Final technical rept. Jan 79-Feb 80,
E. Rachaman, E. Heldman, L. Raveh, Y. Ashani, and I. Barness. Feb 80, 46p
Grant DA-ERO-79-G-0001

This report represents the syntheses and biological evaluations of several novel sugar oximes, analogs of 3 and 4-PAM designed to improve bioavailability of antidotes against organophosphorus (OP) poisoning. Some of the sugar derivatives which were found to be most potent, (N-tetraacetyl glucosyloxypropyl-4-pyridinium aldoxime chloride and N-glucosyl-3-pyridinium aldoxime bromide) as antidotes against TEPP. (Author)

AD-A086 247/4 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
The Effects of Mefloquine on Escherichia coli,
Ruth E. Brown, Frank A. Stancato, and Alan D. Wolfe. 17 Oct 79, 9p
Pub. in Life Sciences, v25 n21 p1857-1864 1979.

No abstract available.

PB80-195399 PC **A03**/MF **A01**
New York Univ. Medical Center, NY.
The Evaluation of Topical Intralesional and Systemic Antiviral Agents, Including Interferon and Interferon Inducers, in Experimental Animal Model Viral Skin Infections.
Annual progress rept. 27 Jan 78-15 Oct 79,
Alvin E. Friedman-Kien, and Richard J. Klein. 15 Oct 79, 49p DAB-ASP-11-44
Contract N01-AI-02131
See also report dated 26 Jan 78, PB-296 637.

Acyclovir (ACV) was able to prevent the fatal outcome of herpes simplex virus-induced skin infections of the lumbosacral or orofacial area in hairless mice. Topical ACV treatment was more effective than systemic treatment in preventing the evolution of skin lesions. Acute ganglionic infections in the trigeminal ganglia were prevented by ACV, and latent ganglionic infections did not become established when the ACV treatment was initiated 3 h after infection. Serum antibody titers were, on the average, eight times higher in mice which developed latent ganglionic infections after ACV treatment than in mice without evidence of herpes simplex virus latency in ganglia. Reinoculation of ACV-treated mice at a site different from that of the primary inoculation did not lead to the establishment of a second latent infection with the homologous virus type when a latent infection was already present.

6P. Physiology

AD-A085 860/5 PC **A03**/MF **A01**
Naval Aerospace Medical Research Lab Pensacola FL
A Review of Dynamic Visual Acuity.
Interim rept.,
Tommy R. Morrison. Mar 80, 28p Rept no. NAMRL-MONOGRAPH-28

In many everyday situations relative motion exists between human beings and the visual information which they must acquire and resolve in order to perform their tasks successfully. In particular, tasks, such as flying aircraft, driving automobiles and other vehicles, and resolving moving information presented via visual displays, impose a requirement on the human operator to process moving information. Since Dynamic Visual Acuity (DVA) is a critical visual skill involved in performing such visual tasks, the present review was undertaken in order to better understand the visual skill and to provide a basis for continuing research in this area. (Author)

AD-A085 923/1 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Human Attention Research Lab
Automatic Processing and the Unitization of Two Features.
Technical rept.,
Walter Schneider, and Ray Eberts. Feb 80, 54p Rept no. 8008
Contract N00014-78-C-0012, Grant PHS-5-R01-MH-31425

In a series of experiments conjunction target detection search (color and shape) was compared with single feature search (color or shape). With appropriate training and sufficient practice, subjects could unitize the features in conjunction condition. Unitization was defined as occurring when performance of the conjunction condition was similar to performance on a single feature condition. In four visual search experiments, performance on conjunctions and single feature shape searches was highly similar across three criteria: (1) slope, (2) positive to negative slope ratios, and (3) percent variance accounted for by the linear component. In another experiment, unitization was shown to be dependent on the type of mapping, either consistent or varied, in a multiple-frame detection experiment. Two other experiments further examined characteristics of single and conjunction feature conditions. In one, the stability of the integral-separable dimension distinction was examined across time. Problems with this approach and distinctions between integrality and unitization were discussed. Another experiment compared single feature and conjunction conditions in a texture

segregation task. With training, conjunction performance was about equal to or better than initial single feature conditions. The relationships between unitization and automatic processing were discussed. (Author)

CEA-CONF-4478 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Biologie.
In Vivo Distribution of Carbon 11 Labeled-Nicotine in Animals. A Method Suitable for Use in Man.
M. Maziere, G. Berger, D. Plummer, D. Comar, and R. Masse. 1978, 22p
U.S. Sales Only.

A method is described to label nicotine with carbon 11. A hundred millicuries can be obtained, in 45 minutes, with a high specific activity. This labeling of nicotine has allowed an "in vivo" study of the distribution of this very toxic drug in animals. Five minutes after injection in rabbits or monkeys, it was shown with a gamma camera or with a positron camera that the radioactivity was very rapidly distributed throughout the tissues especially in brain, lungs and kidneys. exp 11 C-nicotine readily penetrates the blood-brain barrier and the brain radioactivity decreases very sharply with time. The eyes however retained activity, possibly in the retina. Unfortunately the monkey is not the ideal subject for exp 11 C-nicotine brain study because: the brain is small, considering the resolution of the cameras and the cerebral lobes are also quite overlaped in this animal; Japanese authors have shown that compared with dogs the nicotine brain uptake is lower, due to the high affinity of nicotine for skeletal muscle which occupies approximately forty to fifty % of the body weight of the monkey. Also in monkeys, the nicotine destruction is faster than in dogs because there is a higher enzyme nicotine metabolizing activity in the liver of this animal. The differences observed between various animals studies using nicotine indicate that we should not draw any firm conclusions about the behaviour of this drug in humans. In order to do so, examinations must be conducted in man and the method described in spite of its limitations provides a means for such a study. (Atomindex citation 11:499685)

N80-27078/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Effect of Hypodynamia on Mineral and Protein Metabolism in Calcified Tissues of the Maxillodental System (Experimental Radioisotope Study).
A. A. Prokhonchukov, Y. A. Kovalenko, A. G. Kolesnik, Y. I. Kondratyev, and N. A. Ilyushko. Jul 80, 15p NASA-TM-75998
Contract NASW-3199
Transl. Into English from Stomatologiya (USSR), V. 49, No. 4, 1970 p 1-6. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by Central Dental Research Inst., Moscow.

Mineral and protein metabolism was studied in experiments on 60 white rats, using P-32 and Ca-45 uptake in the mineral fractions, 2C-14-glycine in the protein fractions, and P-32 in both fractions of calcified tissues as indices over a 100 day period of experimental hypodynamia. Combined alterations in mineral and protein metabolism occurred in the calcified tissues of the experimental animals. The most pronounced changes were found in P-32 and 2C-14-glycine metabolism. In the incisors and femoral bones, these alterations occurred in two phases: P-32 and 2C-14-glycine uptake first increased, then decreased. Changes in Ca-45 metabolism were less pronounced, particularly in the initial period of the experiment. A marked reduction in P-32, Ca-45, and 2C-14-glycine uptake was found in various fractions of the calcified tissues on the 100th day of experimental hypodynamia.

PB80-813512 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Altitude Acclimatization. 1974-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Jul 80,
Samuel C. Mauk. Aug 80, 40p
Supersedes NTIS/PS-79/0857. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature covers aspects of altitude acclimatization. Included are articles concerning high altitude environments, hypoxia, heart function and hemodynamic responses, physical exercise, human tolerances and reactions, physiological responses, and oxygen consumption. (This updated bibliography contains 164 citations, 35 of which are new entries to the previous edition.)

6Q. Protective Equipment

AD-A085 915/7 PC **A02**/MF **A01**
Naval Ocean Systems Center San Diego CA
Procedural Chafing Gear for Salvage Operations - Field Report.
Final rept. 1978-1979,
R. L. Seiple. May 80, 15p Rept no. NOSC/TR-549

During the Enewetak Atoll Cleanup Operation the need for protective gear for divers and salvage personnel has been dramatically demonstrated. Protective clothing constructed of Kevlar fabric was designed and tested. Conditions of the cleanup effort are discussed, and the impact of the protective gear is presented. (Author)

AD-A085 982/7 PC **A10**/MF **A01**
Technology Inc San Antonio TX Life Sciences Div
Procedural Tests for Anti-G Protective Devices. Volume II. G-Sensitivity Tests.
Final rept. 1 Oct-76-30 Jun 78,
Roy W. Thompson, Carmen E. Galvan, James E. Allred, Paul E. Love, and Larry J. Meeker. Dec 79, 203p SAM-TR-79-31-VOL-2
Contract F33615-77-C-0610

In this volume, an examination of anti-G valve failures is reported, as well as the results of 9 short-term investigation dealing with acceleration protection equipment and studies on the USAFSAM Human Centrifuge. These studies involved: the CWU-9/P undergarments; the Statham PM131TC pressure transducer; the Ready Pressure Anti-G valve; the ALAR 'High flow' and 'Special' anti-G valves; accelerometer calibration, continuous ECG recording; control-center data distribution; closed-loop centrifuge control; and the Medilog recorder. (Author)

N80-27087/9 PC **A10**/MF **A01**
Southampton Univ. (England). Inst. of Sound and Vibration Research.
The Effect of Hearing Protectors on the Perception of Warning and Indicator Sounds: A General Review.
P. A. Wilkins, and A. M. Martin. Aug 78, 217p
ISVR-TR-98
Sponsored by UK Health and Safety Executive.

The literature on the auditory effects of wearing hearing protectors was reviewed. A conceptual model of the perception process suggests that the three components, audibility, attention demand and recognition are of importance. Several suggested methods of predicting the audibility of complex sounds in noise are compared and their limitations highlighted. Although a number of studies consider the attention demand of warning sounds, it is concluded that they do not allow any firm conclusions on the effect of inattention to be drawn. Inconsistent use of hearing protectors could, via a temporary shift in the threshold of hearing, result in signals being inaudible when subsequently wearing hearing protectors. It is hypothesized that by reducing the loudness and changing the spectral character of sounds, hearing protectors may impair their attention demand value and their recognition by the wearer. An evaluation of the situation of workers who suffer from an existing noise-induced hearing loss suggests that when wearing hearing protection their perception of sounds in noise may be governed by their doubly elevated absolute thresholds rather than the masker threshold criteria relevant to those with normal hearing.

6R. Radiobiology

AD-A085 952/0 PC **A03**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Radiofrequency Radiation and Living Tissue: Theoretical Studies.
Interim rept. Jan 78-May 79,
Richard A. Albanese, and Earl L. Bell. Dec 79, 43p Rept no. SAM-TR-79-41

Basic mechanisms whereby radiofrequency electromagnetic radiation can interact with living tissue were investigated. An elementary statistical physics model of tissue, viewed as a chemical mixture, was considered, followed by a nonquantum physics analysis of macromolecular motion in an electromagnetic field. These studies of basic mechanisms suggest that radiofrequency electromagnetic radiation may be important in its effect on living tissue without causing significant tissue-temperature rises. (Author)

AD-A086 068/4 PC **A03**/MF **A01**
Air Force Occupational and Environmental Health Lab Brooks AFB TX
Evaluation of the USAF RHL PIC-PRD, Bendix 1200 MR, DCA 005, and Victoreen 541L Pocket Personnel Radiation Dosimeters.
Final rept.,
Karl L. Prado, William B. Dotter, Donald Greenfield, and Paul E. Love. Mar 80, 35p Rept no. OEHL-TR-80-17

The energy and angular dependence exhibited by the Bendix 1200 MR, Victoreen 541L, DCA 005, and USAF PN 754394 pocket ionization chamber low energy dosimeters has been evaluated. Chambers were exposed to x-rays of 9, 21, 42, 64, 84, 120, and 170 keV effective and their accuracy (measured/actual) computed. All radiations were delivered at 0 degrees, 45 degrees, 90 degrees, 135 degrees, and 180 degrees and their angular dependence (response at X degrees relative to response at 90 degrees) reported. (Author)

CEA-N-2044 PC **A10**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche Fondamentale.
Grenoble Fundamental Research Department. Semi-Annual Bulletin No. 12, 1978, 1E Semester.
1978, 212p
In French.
U.S. Sales Only.

Results obtained in solid state physics and radiobiology are presented. (Atomindex citation 11:503206)

CEGB-RD/B/N-4565 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Development of Criteria for Limiting the Non-Uniform Irradiation of Skin: The Rationale for a Study of Non-Stochastic Effects.
J. Wells, and M. W. Charles. Jun 79, 35p
U.S. Sales Only.

Recent recommendations of the ICRP (1977) provide little guidance for the treatment of non-uniform skin exposures such as those which may occur as the result of contamination with radioactive particulates. This lack of guidance is due to a paucity of data regarding biological effects in this area. A rationale is presented for the study of the early (non-stochastic) effects of non-uniform skin irradiation. As a basis for the presentation of this rationale a framework is provided by a resume of basic biology of the skin and a review of previous experimental work in this field. Animal experiments, which are being carried out in collaboration with specialist university groups, are described both in terms of broad concept and experimental detail. The aim is to provide biological data which can provide guidance in radiological protection situations. (Atomindex citation 11:502440)

CONF-791051-22 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Neutron Dosimeter Materials Development and Characterization.
H. L. Adair, E. H. Kobisk, J. A. Setaro, T. C. Quinby, and J. A. Carter. 1979, 18p
Contract W-7405-ENG-26
ASTM-EURATOM symposium on reactor dosimetry, Ispra, Italy, 1 Oct 1979.

In 1971, the Isotope Research Materials Laboratory (IRML) at the Oak Ridge National Laboratory (ORNL), began a neutron dosimeter development program. The main goal of the program is to produce neutron dosimeter materials for use in deter-

mining the neutron energy spectra, flux, fluence and burnup in fast reactor environments. Since 1971, many developments have been made which have reduced the fabrication cost and improved the characterization of the dosimeter materials. The IRML program, which now includes preparation of dosimeters that can be used in light water, controlled thermonuclear as well as fast breeder reactor environments, will be summarized with particular emphasis on materials development and characterization. (ERA citation 05:022712)

CONF-791203-9 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Proposed Training Program for Construction Personnel Involved in Remedial Action Work at Sites Contaminated by Naturally Occurring Radionuclides.
B. A. Berven, W. A. Goldsmith, F. F. Haywood, and K. J. Schiager. 1979, 11p
Contract W-7405-ENG-26
Health Physics Society meeting, Honolulu, HI, USA, 10 Dec 1979.

Many sites used during the early days of the US atomic energy program are contaminated with radionuclides of the primordial decay chains (uranium, thorium, and actinium series). This contamination consists of residues resulting from refining and processing uranium and thorium. Preparation of these sites for release to unrestricted private use will involve the assistance of construction workers, many of whom have limited knowledge of the hazards associated with radioactive materials. Therefore, there is a need to educate these workers in the fundamentals of radioactive material handling to minimize exposures and possible spread of contamination. This training should disseminate relevant information at an appropriate educational level and should instill a cautious, common-sense attitude toward the handling of radioactive materials. The training should emphasize basic information concerning environmental radiation within a context of relative risk. A multi-media format, including colorful visual aids, demonstration, and discussion, should be used to maximize motivation and retention. A detailed, proposed training program design is presented. (ERA citation 05:023756)

DOE/EV/02874-68 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Osteosarcomas among Beagles Exposed to exp 239 Plutonium. Technical Report No. 34.
Mar 80, 30p
Contract AC02-EV02874

A Weibull distribution was fit to the osteosarcoma death times of beagles given single intravenous injections of exp 239 Pu. For injected doses in the range 0 to 1 mu Ci/kg the osteosarcoma incidence rate h(t) at t days after injection can be fit by a quadratic function of the injected dose. The best fitting linear function was rejected by the data ($p < 0.001$). A different formula for h(t), derived from amultistage theory for osteosarcoma induction, was also fit to these data. For this purpose microdosimetry calculations were used to estimate the dose to the cells at risk in the endosteal layer (endosteal dose). According to the best fit, h(t) is a quadratic function of endosteal dose at low doses. A linear dose-response relationship was agan rejected. The absence of a linear component at low doses might be explained by the fact that 106 of the 185 animals injected at the lowest doses (< 0.02 mu Ci/kg) were still alive at the time these data were collected. (ERA citation 05:024751)

DOE/EV/03221-61 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Chain Inequivalence in Bovine Methemoglobin. Progress Report, December 1, 1979-November 30, 1980.
Y. A. Ilan, Y. Ilan, M. Chevion, and G. Czapski. 1980, 25p
Contract AC02-76EV03221

Using pulse-radiolysis, a single-heme in the tetramer of bovine methemoglobin was reduced to the ferro state, producing a valence hybrid (VH). The kinetics of oxygen binding to the VH as well as the re-oxidation of the ferro-heme to the ferric state were studied as a function of pH. The kinetics of the oxygenation revealed the existence of two species, characterized by high and low affinities for oxygen that are associated with two quaternary structures (R and T, respectivey). Above pH 7.7 only the R state could be observed, while below pH 6.5 the T state was dominant. The reaction between the VH and ferricyanide at pH 7.75 (R state) consisted of two equal contributions attributed to the beta and alpha subunits within the tetramer, respectively. At pH 6.3 (T state) a similar phenomenon was observed indicating chain inequivalences both in the T and the R states of methemoglobin. In the presence of inositol hexaphosphate, the T implies R transition was shifted up by about 0.35 pH units. Yet similar rate constants exhibiting similar chain inequivalences have been measured. (ERA citation 05:024733)

DOE/EV/03221-62 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Does Oxygen Enhance the Radiation: Induced Inactivation of Penicillinase. Progress Report, December 1, 1979-November 30, 1980.
A. Samuni, A. Kalkstein, and G. Czapski. 1980, 21p
Contract AC02-76EV03221

The radiation-induced inactivation of penicillinase in dilute aqueous solutions buffered with phosphate was studied, by examining enzyme radiosensitivity in the presence of various gases (He, O sub 2 , H sub 2 , N sub 2 O, N sub 2 O + O sub 2). The introduction of either N sub 2 O or O sub 2 was found to reduce the radiodamage. On the other hand H sub 2 or N sub 2 O + O sub 2 gas-mixture enhanced the radiosensitivity. In the presence of formate and oxygen, no enzyme inactivation was detected. The results indicated that the specific damaging efficiency of H atoms is almost four-fold higher than that of OH radical; therefore in phosphate buffer, where more than half of the free radicals are H atoms, it is the H radicals that are responsible for the majority of the damage. The superoxide radicals appeared to be completely inactive and did not contribute toward enzyme inactivation. Oxygen was shown to affect the radiosensitivity in two ways. On one side, it protected by converting e exp - /sub aq/ and H radicals into harmless O sub 2- radicals. On the other side it increased the inactivation by enhancing the damage brought about by OH radicals (OER = 2.8). In the present case the oxygen effect of protection exceeded that of sensitization, thus giving rise to a moderate overall protection effect. (ERA citation 05:024734)

DOE/EV/03221-64 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Contribution of Endogenous and Exogenous Damage to the Total Radiation-Induced Damage in the Bacterial Spore.
G. P. Jacobs, A. Samuni, and G. Czapski. 1980, 18p
Contract AC02-76EV03221

Radical scavengers such as polyethylene glycol 4000 and bovine albumin have been used to define the contribution of exogenous and endogenous damage to the total radiation-induced damage in aqueous buffered suspensions of Bacillus pumilus spores. The results indicate that this damage in the bacterial spore is predominantly endogenous. (ERA citation 05:024744)

JAERI-M-7979 PC **A13**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Health Physics and Safety in JAERI, No.20 (April 1, 1977 - March 31, 1978).
Jan 79, 277p
In Japanese.
U.S. Sales Only.

In the annual report No. 20 (fiscal 1977) are described the activities of health physics and safety in the Tokyo Office, Tokai Research Establishment, Takasaki Radiation Chemistry Research Establishment, and Oarai Research Establishment. (Atomindex citation 11:503207)

JAERI-M-8019 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
THIDA: Code System for Calculation of the Exposure Dose Rate around a Fusion Device.
H. Iida, and M. Igarashi. Dec 78, 68p
In Japanese.
U.S. Sales Only.

A code system THIDA has been developed for calculation of the exposure dose rates around a fusion device. It consists of the following: one- and two-dimensional discrete ordinate transport codes; induced activity calculation code; activation chain, activation cross section, radionuclide gamma-ray energy/intensity and gamma-ray group constant files; and gamma ray flux to exposure dose rate conversion coefficients. (Atomindex citation 11:503175)

JAERI-M-8141 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Characteristic Tests of Ionization Chamber and GM Counter Survey Meters for beta-Rays (2). Estimation of Skin Dose Rates.
S. Suga, K. Bingo, and Y. Kajimoto. Mar 79, 38p
In Japanese.
U.S. Sales Only.

To estimate a beta-ray absorbed dose rate of contaminated skin, measurements were done twice by a survey meter without and with a filter, keeping the distance from the contaminated skin surface to the survey meter at 10 mm. The absorbed dose rate was obtained multiplying a net reading (equals a reading of survey meter's indicator measured without the filter minus that measured with the filter) by a multiplying factor. Calibrations were made with reference plane sources of natural uranium, exp 198 Au and exp 204 Tl, varying their area. The five types of ionization chamber survey meters had nearly same multiplying factors when the diameter of source was larger than the diameter of the chamber cylinder. Estimation of the absorbed doses due to beta-emitting nuclides was possible when the measured value without filter was larger by 20% or more than that of with filter. In the case of small sources, the multiplying factor varied significantly with area of the source. The multiplying factors agreed within +-30% in the respective types i.e. manufacturers and in maximum beta-ray energies from 0.7 up to 2.5 MeV. In the source to detector distance of 1 cm +-0.2 cm, the multiplying factor varied within +-20%. The multiplying factor of a GM counter survey meter varied with beta-ray energy, the multiplying factor for uranium was 1/3 that of exp 204 Tl. (Atomindex citation 11:502606)

LA-UR-80-1038 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Laser Protective Eyewear Program at the Los Alamos Scientific Laboratory.
D. C. Winburn. 1980, 24p CONF-800531-1
Contract W-7405-ENG-36
Industrial hygiene conference, Houston, TX, USA, 18 May 1980.

The proliferation of lasers at Los Alamos focused considerable attention on providing adequate eye protection for experimenters involved in the use of a wide variety of nonionizing radiation. Experiments with fast-pulsed lasers (Nd:YAG, HF, and CO sub 2) were performed to gain biological threshold data on ocular damage. In parallel, eye protection devices were evaluated, which resulted in the development of lightweight, comfortable spectacles of colored glass filters that can be ground to prescription specifications. Goggle styles are employed in specific applications. (ERA citation 05:023075)

LA-8246-M MF **A01**
Los Alamos Scientific Lab., NM.
Los Alamos Scientific Laboratory X-Ray Survey Manual.
R. H. Olsher. Feb 80, 47p
Contract W-7405-ENG-36
Microfiche copies only.

A manual has been developed by the Health Physics Group to establish procedures for routine testing of industrial and analytical x-ray equipment for compliance with applicable LASL administrative requirements and technical bulletins. Radiation protection survey procedures were developed for the following types of equipment: x-ray diffraction and fluorescence analysis systems, industrial cabinet x-ray systems, industrial noncabinet x-ray systems, and electron microscopes. (ERA citation 05:023301)

NIRS-AR-20 PC **A10**/MF **A01**
National Inst. of Radiological Sciences, Chiba (Japan).

Annual Report of National Institute of Radiological Sciences of the Fiscal Year 1977.
Oct 79, 213p
In Japanese.
U.S. Sales Only.

Activities of the NIRS for the period of April 1976 to March 1977 are reported in individual summaries. As special research projects, the 'studies on the estimation of exposure doses due to environmental radiation' was concluded. In the 'studies on the estimation of dangers to the human body of low-level radiation,' a late radiation injuries laboratory was completed. Then, in the 'studies on medical usage of a cyclotron,' the therapy by fast neutrons and the applications of short-lived RIs have proceeded successfully. Contents are the following: special research projects; regular research works in such as physics, chemistry, biology, genetics, physiology/pathology, injuries, pharmacy, hygiene, clinics, and ecology; radioactivity surveys; supporting services; medical works; administrative works, and so on. (Atomindex citation 11:503208)

NRPB-DL-1 PC **A02**/MF **A01**
National Radiological Protection Board, Harwell (England).
Estimation of Derived Limits.
N. T. Harrison, P. M. Bryant, R. H. Clarke, and F. Morley. Aug 79, 6p
U.S. Sales Only.

In practical radiation protection, it is often necessary to calculate limits of intake of radionuclides associated with various quantities; such limits are needed, for example, to assess the adequacy of the control of environmental contamination. In publication 26 of the International Commission on Radiological Protection (ICRP), these limits, when related to the basic limits of dose-equivalent by a defined model, are referred to as Derived Limits (DLs). In the present report the principles to be adopted by the Board in calculating DLs to be recommended for general application within the United Kingdom are outlined. DLs will be recommended for a wide range of radionuclides and for circumstances relevant to the workplace, and, more frequently, the general environment. The latter will include DLs in foodstuffs and associated environmental materials, such as soil and grass, and DLs for discharges from stacks. DLs will be related to dose equivalents for workers or members of the public for stochastic or non-stochastic effects as appropriate. Consideration will be given to relevant data on radiosensitivity, metabolism and dosimetry for children and to the physicochemical forms of radionuclides. (Atomindex citation 11:502570)

NRPB-R-74 PC **A05**/MF **A01**
National Radiological Protection Board, Harwell (England).
Variation of Organ Doses with the Particle Size and Chemical Form of an Inhaled Radioactive Aerosol.
B. W. Hunt, N. Adams, and J. A. Reissland. Apr 79, 91p
U.S. Sales Only.

In this report, radiation doses to organs are calculated as a function of the particle size of the inhaled radioactive material. Aerosols with an Activity Median Aerodynamic Diameter (AMAD) from 0.1 mu m to 20 mu m are considered and doses accumulated by various organs in periods ranging from 1 day to 70 years are given for 65 radionuclides. A computer program is used which calculates the transformations taking place in each organ per curie of inhaled nuclide from the basic radioactivity and metabolic data. The program also calculates the resulting doses both for the organ in which the transformations occur and from penetrating radiation emitted as a result of transformations in other organs. The effects of particle size and chemical form of the nuclides on the doses received by organs are discussed. Tables of doses accumulated by 10 specific organs and other organs together with effective whole body doses are given for particle sizes 0.1 mu m, 1 mu m and 10 mu m. (Atomindex citation 11:502451)

N80-27068/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Change in Radiosensitivity of Rats During Hypokinetic Stress.
I. P. Chernov. Jan 80, 11p NASA-TM-75968
Contract NASW-3198
Transl. Into English from Radiobiologiya (USSR), No. 4, 1978 p 574-578. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The laws governing stress modification of radiation sickness in relation to hypokinetic stress were investigated. It was found that gamma irradiation (800 rad) of rats on the third day of exposure to hypokinesia increased the radiosensitivity of the animals which was determined by the survival rate and the dynamics of body weight and the weight of some internal organs. The same radiation dose was given on the 20th day of hypokinesia and on the third day of recovery from the 20 day hypokinesia decreased the radiosensitivity of rats. It is concluded that the variations in the radiosensitivity observed may be due to a stress effect of hypokinesia.

PB80-199896 Not available NTIS
National Bureau of Standards, Washington, DC.
The Response of Plastic Dosimeters to Gamma Rays and Electrons at High Absorbed Dose Rates.
Final rept.,
W. L. McLaughlin, J. C. Humphreys, B. B. Radak, A. Miller, and T. A. Olejnik. 1979, 16p
Pub. in Trans. International Meeting in Radiation Processing, Radiation Physics and Chemistry (2nd), Miami, FL, November 16-19, 1978, Radiat. Phys. Chem. 14, p535-550 1979.

Several clear plastics and dyed plastics are commercially available for dosimetry in intense radiation fields, particularly for radiation processing applications using gamma rays from intense cobalt-60 sources and electron beams from accelerators running at potentials from 0/1 to 10 MeV. For calibrations with gamma rays, only those plastics containing the radiochromic triphenylmethane cyanides or methoxides, i.e. nylon, polychlorostyrene, polyvinylbutyral, or polyvinylpyrrolidone, can correctly interpret dose determinations from electron beam irradiation. The other systems show a marked rate dependence of response. Of radiochromic dye systems, only polyvinylpyrrolidone as host matrix can be read with precision immediately after electron irradiation, since a slow build-up of the absorption band during the first hours after irradiation occurs in the other radiochromic plastic systems.

PB80-201221 PC **A02**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Bureau of Radiological Health Publications Subject Index.
Semiannual rept. Nov 79-May 80.
May 80, 16p FDA/BRH-80/106
Supersedes PB80-126329.

This 'Subject Index' identifies Bureau publications by broad subject areas and is not intended to be a complete cross index containing name of author, date of publication, and other such biographical information. In nearly all cases the publications are numbered in the FDA publication series consisting of the FDA acronym, a 2 digit code for the fiscal year of publication, and a 4 digit code for the individual publication number.

RL-79-057 PC **A18**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Investigation of the Linear Energy Transfer Distribution in a Beam of Negative pi-Mesons.
C. A. Lewis. Jul 79, 420p
Thesis.
U.S. Sales Only.

A review of the possible therapeutic advantages of negative pions is given and the more prolific of the dedicated facilities are described. The results are given of an examination of the microdosimetry of negative pion absorption in tissue through the measurement of event size spectra with proportional counters, and of the subsequent unfolding of these spectra in terms of LET distributions. The parameters LET and event size are discussed and methods of deriving LET distributions from event size measurements examined. Experiments with three tissue equivalent proportional counters of different geometry at the Rutherford Laboratory negative pion facility are described and the processing of the event size data is discussed. Fractional absorbed dose in LET distributions are presented for each of the counters at various positions of interest over the negative pion ionization profile. Quality Factors have been calculated from the data taken with the spherical counters and a Quality Factor of 5 is suggested for a negative pion beam. Results of measurements at two neutron facilities, a cyclotron neutron source and a 14 MeV neutron source, are also presented. Anomalies in the derived LET distributions are discussed. (Atomindex citation 11:500008)

SAAS-227 PC **A03**/MF **A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Radiation Protection Type Testing.
N. Dymke, R. Friemert, G. Grosse, D. Herrmann, and W. Kraus. 1978, 36p
In German.
U.S. Sales Only.

In the GDR, radiation protection type tests (type tests from the radiation protection point of view) are prescribed by law for the following groups of products: sealed sources; equipment containing sealed sources (such as teletherapy apparatus and flaw detectors); equipment in which charged particles are accelerated (such as x-ray machines and neutron generators); equipment in which ionizing radiation arises as an unwanted byproduct (such as television sets and electron microscopes). Based on the practical experience gained during the past seven years, several problems associated with type testing and licensing are discussed in detail. (Atomindex citation 11:502568)

UR-3490/LCP-20 PC **A11**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Analysis of the Effects of Chemical and Physical Mutagens on Subchromosomal DNA Synthesis in Cultured Mammalian Cells.
D. B. Dahle. 1980, 245p
Contract AC02-76EV03490
Thesis.

Subchromosomal DNA synthesis in Chinese hamster V-79 cells exposed to methyl methanesulfonate (MMS), x radiation, and ultraviolet (uv) radiation was investigated. The results indicate that these agents disturb DNA synthesis at the replicon level via two mechanisms of action, inhibition of replicon initiation or transient blockage of DNA chain growth. Exposure to uv or to MMS effects both DNA chain growth and initiation. In contrast, the depression in DNA synthetic rate in x-irradiated cells is due exclusively to inhibition of replicon initiation. For the most part, the damage inflicted upon the DNA synthetic apparatus produced by the three agents is repairable. The inhibition of replicon initiation produced by each of the three agents studied appears to be a complex metabolic phenomenon, and speculation regarding several mechanisms by which replicon initiation may be inhibited is elaborated upon in the text. (ERA citation 05:024736)

6S. Stress Physiology

AD-A086 026/2 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Thermal and Acceleration Effects on Aircrew Members in Chemical Defense Gear.
Technical rept. Nov 78-Jan 79,
Ronald E. Yates, Clyde R. Replogle, and James H. Veghte. Jan 80, 36p Rept no. AFAMRL-TR-79-71

An experiment was conducted to determine the combined thermal and acceleration effects on aircrew members in chemical defense protective gear in a simulated air-to-ground mission. The subject flew two sorties per day in the Dynamic Environment Simulator. The environmental conditions simulated were typical of a 95th percentile hot summer central European day. Most of the responses seen in the subjects can be attributed to the thermal stress caused by the hot temperatures and the heavy protective clothing. (Author)

N80-27074/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.

Changes in Leukocyte Stability in Hypodynamia.
I. I. Federov, Z. P. Federova, Y. N. Pekus, and T. L. Sakun. Jan 80, 8p NASA-TM-75944
Contract NASW-2791
Transl. Into English from Vrach. Delo. (USSR), Apr. 1972, p 44-48. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Leukocytolysis was determined under conditions of hypokinesia of 10 days to 1 month duration in healthy persons and in experiments on albino rats of 1 month duration. It was found that prolonged restriction of movement resulted, both in clinical and experimental conditions, in a considerable increase of leukocytolysis (by two-three-fold). Leukocytolysis also continued for several days after cessation of hypokinesia.

N80-27079/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Behavior of Fatty Acids in the Blood Plasma of Monkeys Following Exposure to Short Term Stresses.
M. L. Michailov, U. Gnuechtel, S. Nitschkoff, R. Baumann, and G. Gnauck. May 80, 8p NASA-TM-76151
Transl. Into English from Acta Biol. Med. Ger. (Germany, D.R.), V. 32, 1974 p 675-680. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by East German Acad. Of Sci.

Monkeys exposed to short term stresses (immobilization, jealousy) were found to develop hyperlipacidemia with a rise in concentration of unsaturated fatty acids in blood plasma, especially of oleic acid, and a relative decrease of saturated free fatty acids, chiefly of palmitinic acid. This finding was more pronounced under immobilization stress than in the jealousy situation. Meanwhile, the composition of triglycerides did not change essentially under the conditions used.

6T. Toxicology

AD-A086 041/1 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Topical Hazard Evaluation Program of Candidate Insect Repellents AI3-34155, 1-(4-chlorophenoxy)-2-(2-methoxyethoxy)-ethane, and AI3-34156, 1-(4-chlorophenoxy)-2-(2-ethoxyethoxy)-ethane.
Final rept. Feb 77-Apr 80,
Allen W. Singer. Apr 80, 9p Rept nos. USAEHA-75-51-0015-80, USAEHA-75-51-0016-80

Preliminary hazard evaluations of AI3-34155 and AI3-34156 were performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. The technical grade compounds did not cause skin, eye, or photo irritation. They did not prove to be skin sensitizers or to be acutely toxic by ingestion. It was recommended that both compounds be approved for further testing as candidate insect repellents. (Author)

AD-A086 187/2 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Topical Hazard Evaluation Program of Candidate Insect Repellent AI3-36747a, US Department of Agriculture Proprietary Compound, October 1976 to April 1980.
Final rept.,
Allen W. Singer. 17 Jun 80, 8p Rept no. USAEHA-75-51-0013-80

A preliminary hazard evaluation of AI3-36747a was performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. The technical grade compound proved to be a moderate sensitizer in guinea pigs, and caused mild primary skin and eye irritation in rabbits. It was recommended that AI3-36747a, USDA proprietary compound, not be approved for further testing as a candidate insect repellent. (Author)

CONF-790863-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Mutagenicity Testing of Aqueous Materials from Alternate Fuel Production.
T. K. Rao, F. W. Larimer, C. E. Nix, and J. L. Epler. 1979, 17p
Contract W-7405-ENG-26
Symposium on analysis of waters associated with alternate fuel production, Pittsburgh, PA, USA, 4 Jun 1979.

In a multidisciplinary effort, we are attempting to establish a data base for toxicity evaluation of a variety of aqueous effluents and aqueous extracts from solid wastes from fossil fuels, synthetic fuels, and shale oil-derived fuels. In genetic toxicology testing, short-term mutagenicity tests, including bacterial, fungal, insect, and mammalian cell systems, have been applied in a comparative sense to exemplary test materials. The Salmonella histidine reversion assay (Ames' test) has been shown to be generally applicable especially when utilized with chemically fractionated materials. Liquid-liquid extraction and column chromatography are used to separate crude test materials into defined fractions for bioassay paralleled by chemical analyses. Test materials have included various crude oils and product waters along with extracts from raw shale and processed shale. Mutagenic materials have been observed and quantitated. Extrapolations to specific compounds and to the overall biohazard of the test materials are in progress. Comparative studies with samples from existing petroleum technologies and fossil fuel processes are being carried out. (ERA citation 05:024765)

CONF-7910138-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Effects on Carp Embryos (Cyprinus Carpio) and Daphnia Pulex of Chlorinated Organic Compounds Produced During Control of Fouling Organisms.
J. R. Trabalka, S. C. Tsai, J. S. Mattice, and M. B. Burch. 1979, 16p
Contract W-7405-ENG-26
Conference of chlorination: environmental impact and health effects, Colorado Springs, CO, USA, 28 Oct 1979.

Chlorinated organic compounds have been identified in cooling, waste treatment, and drinking waters after application of chlorine. The advisability of chlorination for some purposes and the suitability of present chlorination technology for others have been questioned. Cooling waters, by reason of volume alone, are a potentially significant source of chlorinated organics of which twenty-one have already been identified. Although the acute toxicity of two synthetic power plant effluents and many of the 17 component compounds to carp embryos and Daphnia pulex has been determined, information on environmental persistence and fate, acute and chronic toxicity, and bioaccumulation of power plant chlorination products is needed to assess their potential for environmental impact. Results of: (1) decay studies of the trihalomethanes and four nonvolatile chlorinated organics; (2) acute toxicity tests with four trihalomethanes and carp embryos; and (3) chronic toxicity tests with Daphnia pulex and selected chlorinated organics and synthetic effluents under limited conditions are reported. (ERA citation 05:023149)

CONF-7910146-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Screening for Mutagenic Response of Six Coded Chemicals in the CHO/HGPRT System.
A. W. Hsie, J. P. O'Neill, R. Machanoff, R. L. Schenley, and P. A. Brimer. 1979, 15p
Contract W-7405-ENG-26
International program for the evaluation of short-term tests for carcinogenicity, St Simons, GA, USA, 16 Oct 1979.

A set of stringent conditions required for quantifying mutation-induction to 6-thioguanine resistance, which selects for > 98% variants with altered hypoxanthine-guanine phosphoribosyl transferase (HGPRT) activity in a near-diploid Chinese hamster ovary (CHO) cell line have been defined. The system fulfills criteria for a specific locus mutational assay and is useful in studies of mechanisms of mammalian cell mutagenesis, determination of the mutagenicity of various physical and chemical agents, and screening for mutagenic activity of some industrial chemicals. Preliminary findings on the application of this system in screening for the mutagenic activity of 6 coded chemicals supplied by the International Program for the Evaluation of Short-Term Test for Carcinogenicity are presented. The study limits itself to concerns more with mutagenic response than quantitative mutagenesis. Although our limited study of 6 out of 42 chemicals in no way could be used for evaluating the performance of the CHO/HGPRT system; nevertheless, it could shed some light on identifying certain considerations necessary for applying this system for screening the mutagenic activity of unknown chemicals. (ERA citation 05:024763)

HRP-0030852/8 PC **A02**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Intake by Man of Minute Contaminants from Water and Food. Report on an Evaluation Group Held at Brussels, Belgium on April 12-14, 1976.
1976, 18p

Microcontaminants found in water and food were the focus of a working group organized by the World Health Organization's Regional Office for Europe. The working group established a list of general categories into which sources of microcontaminants in water and food could be grouped and considered available information on toxicity, control by prevention or treatment, and research needs for each category. The list included treatment agents and processes, polyhalogenated compounds, pesticides (including herbicides), metals and metalloids, materials in contact with food and water, fertilizers, feed additives, microbial toxins and natural poisons, industrial chemicals, cosmetics and detergents, industrial chemicals, drugs, chemicals used in the home, radioactive waste and fallout, combustion and exhaust emissions, and precursors of nitrosamines. Although the working group did not propose specific lines of research generally related to all aspects of microcontaminants in water and food, it recommended that epidemiological studies of water intake and its relation to mortality or cancer be undertaken, and that measures to assure that the introduction of new chemicals creates no health hazard due to their presence in drinking water or food be introduced.

PB80-197833
University of West Florida, Pensacola. Dept. of Biology.
A Bethnic Bioassay Using Time-Lapse Photography to Measure the Effect of Toxicants on the Feeding Behavior of Lugworms (Polychaeta:Arenicolidae).
Journal article,
Norman I. Rubinstein. c1979, 13p EPA-600/J-79-097
Grant EPA-R-804458
Pub. in Marine Pollution: Functional Responses, p341-351 1979.

A benthic assay was developed utilizing time-lapse photography to measure the feeding activity of a lugworm. Arenicola cristata. Automated 35 mm cameras were used to record formation of feeding funnels at 12-hour intervals. Substrate surface area reworked by lugworms held under identical conditions in separate aquaria was plotted against time to determine substrate reworking rates for each group. Rates were subjected to linear regression analysis and compared to demonstrate that no significant difference between the slopes of the calculated lines existed. Therefore, a difference in slope when one group is exposed to a toxicant could provide a measure of effect on lugworm activity. Lugworms also were exposed to the pesticide, Kepone, and their rate of substrate reworking was compared with unexposed lugworms. Kepone was acutely toxic to lugworms at a concentration of 29.5 micrograms/l. A significant difference in substrate reworking rates was observed following exposure to concentrations as low as 2.8 micrograms/l Kepone in seawater. It is suggested that a behavioral response to toxicity testing provides a sensitive and realistic approach for evaluation of ecological impact of pollutants on the marine environment.

PB80-197841 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Toxicity of Textile Mill Effluents to Freshwater and Estuarine Algae, Crustaceans and Fishes.
Journal article,
Gerald E. Walsh, Lowell H. Bahner, and William B. Horning. 1980, 13p EPA-600/J-80-023, CONTRIB-388

Pub. in Environmental Pollution (Series A) 21, p169-179 1980.

The toxicity of secondary waste effluents from textile manufacturing plants was determined with freshwater (Selenastrum capricornutum, Daphnia pulex, Pimephales promelus) and estuarine (Skeletonema costatum, Palaemonetes pugio, Cyprinodon variegatus) organisms. Daphnia pulex was generally the most sensitive animal, but no animal responded to all wastes. Growth of the algae S. capricornutum and S. costatum was affected by all wastes, through either inhibition or stimulation. Some wastes were stimulatory to S. costatum at low concentrations (<1%) but inhibitory at high concentrations (>50%). The concentration of waste that stimulated growth of S. costatum by 20% compared with controls (SC20) was calculated and used with EC50 values for the survival of D. pulex to estimate the potential impact of the wastes in relation to volume of discharge.

PB80-200017 PC **A02/MF A01**
Environmental Research Lab., Gulf Breeze, FL.
Pesticides: Their Impact on the Estuarine Environment.
Journal article,
DeWayne R. Nimmo. 1979, 14p EPA-600/J-79-098, CONTRIB-366
Pub. in Marine Pollution: Functional Responses, p259-270 1979.

Published research factors influencing the use of pesticides are discussed. One section reviews recent research on the effects of new pesticides that include insect growth regulators, including Permethrin(R), Altosid(R), and Dimilin(R). In life-cycle toxicity tests with the mysid Mysidopsis bahia, the 96-hr LC50 of Dimilin was 2.06 micrograms/l (95%) CL= 1.63 to 2.69 micrograms/l and estimated concentration of 75 micrograms/l (parts per trillion) significantly reduced the number of young produced by each female mysid. Author concludes: (1) more emphasis is needed on predicting or monitoring obvious potential sources of accidental estuarine contamination, as is being made possible by recent toxic substances legislation; (2) the ecological importance of non-point source of pesticides is documented from reports of effects observed on field populations of non-target animals exposed to a number of pesticides; (3) laboratory studies may underestimate the potential for environmental damage in the field.

PB80-200033 Not available NTIS
Environmental Research Lab., Gulf Breeze, FL.
A Marine Algal Bioassay Method: Results with Pesticides and Industrial Wastes.
Journal article,
Gerald E. Walsh, and Shelley V. Alexander. 14 Sep 79, 13p EPA-600/J-80-024, PUB-385
Pub. in Water, Air and Soil Pollution 13 p45-55 1980.

A simple marine algal bioassay method is described for short- and long-term studies on pesticides and industrial wastes. It can be used for rapid screening of a variety of substances with single-species and multiple-species tests and gives relative toxicities of the pollutants tested. Algae are grown in optically matched culture tubes that fit directly into a spectrophotometer, allowing population density to be estimated by absorbance without removal of samples. 96 h EC50 values for some pesticides and the diatom Skeletonema costatum are: EPN, 340 micrograms/l; carbophenothion, 109 micrograms/l; DEF, 366 micrograms/l; ethoprop, 8.4 milligrams/l; methyl parathion, 5.3 milligrams/l; and phorate, 1.3 milligrams/l. Presence of the chelator EDTA in medium had no effect on toxicity of carbaryl to S. costatum, Nitzschia angularum, Chlorococcum sp. and Chlorella sp. Liquid industrial wastes either stimulated growth, inhibited growth, or stimulated growth at low concentrations but inhibited it at higher concentrations. In mixed-species studies with the herbicide neburon, presence of a resistant species protected the sensitive species. Liquid industrial waste from a paper products plant caused changes in relative numbers, as compared to controls, when S. costatum and Porphyridium cruentum were grown together.

PB80-201072 PC **A02**
Hawaii Univ., Honolulu. Dept. of Physiology.
Effects of 2,4-Dinitrophenol on the Body Temperature and Cardiopulmonary Functions in Unanaesthetized Rats, 'Rattus rattus',
T. N. Takehiro, K. Shida, and Y. C. Lin. 16 Apr 79, 7p UNIHI-SEAGRANT-JC-80-02, NOAA-80052708
Grant NOAA-04-8-M01-178
Pub. in Jnl. pf Thermal Biology, v4 p297 301 1979.

Infusion of 6-12 mg/kg 2,4-dinitrophenol in the awake rat causes cardiovascular and respiratory responses similar to those induced by physical activity. Respiratory rate, tidal volume and minute ventilation rises promptly following DNP infusion indicating that the response to DNP is activated via a reflex loop in respiratory control. On the other hand, heart rate increased gradually as a function of body temperature. The dosages of 6-12 mg/kg DNP are suitable for the awake rat to simulate exercise-induced caripulmonary responses.

UCRL-52932 PC **A03/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Examination of the Effects of 50 PpB Copper on the Black Abalone, Haliotis Cracherodii.
P. L. Yaffe. 25 Oct 79, 47p
Contract W-7405-ENG-48

The short-term uptake of copper by the black abalone, Haliotis cracherodii, was studied to determine the toxic effects of copper on these animals. Radioactive copper-64 was used as a tracer in both a control aquarium, which contained seawater with the natural background level of 5 ppB copper, and an experimental aquarium, which contained the same seawater plus an additional 50 ppB copper as copper sulfate. A total of 18 abalone were used, 9 in each aquarium. Three abalone were removed and dissected at each sampling time. The data obtained from two analytical methods were compared to identify trends of copper accumulation in certan tissues. The most likely cause of death of abalone exposed to elevated copper concentrations (e.g., 50 ppB) is suffocation due to mucus smothering the gills. Also, abalone blood does not appear to absorb much excess copper. The kidney accumulates some copper, as does the gonad. Accumulation of copper in the gonad could have deleterious effects on the gamates. In addition, the digestive gland appears to be the organ of storage for heavy metals; this tissue can accumulate copper to concentrations almost 100 times greater than in any of the other tissues. (ERA citation 05:024770)

7. CHEMISTRY

7A. Chemical Engineering

BSDF-39-2Q-80 PC **A02/MF A01**
Beet Sugar Development Foundation, Fort Collins, CO.
Technical and Economic Feasibility of Membrane Technology. Technical Progress Report, December 17, 1979-March 16, 1980.
A. Sandre. 1980, 17p
Contract AC03-79CS40213

The potential application of reverse osmosis, ultrafiltration, and electrodialysis to the system of solids concentration in beet sugar process streams was investigated. All available membranes potentially applicable to the process will be tested for application and durability under typical pH, heat pressure and recycle conditions. Possible reduction of energy requirements for evaporation by 15 to 20% is expected. (ERA citation 05:023834)

DOE/ET/14803-T4 PC **A03/MF A01**
Amoco Oil Co., Naperville, IL. Research and Development Dept.
Coal Liquefaction Catalyst Development. Quarterly Progress Report No. 3, October 1-December 31, 1979.
D. K. Kim, R. J. Pellet, and J. A. Mahoney. Jan 80, 38p
Contract AC01-79ET14803

Catalytic baseline runs continued with HDS-1442A in order to improve our baseline statistics as well as to monitor batch reactor performance. Testing of several new catalyst formulations was completed. No promising candidates for testing in the continuous aging unit were identified. The new SRC-II slurry oil was evaluated as a hydrogen donor liquefaction solvent. Our data indicates that the SRC-II heavy distillate oil is not as effective a hydrogen donor solvent as the hydrogenated anthracene oil. It is possible that the catalyst plays a key role in the thermal liquefaction reactions by improving the hydrogen donor properties of the slurry oil through in-situ hydrogenation. The differences in liquefaction behavior between Illinois No. 6 and Wyodak coal were determined. A major portion of our effort was concerned with ascertaining the liquefaction behavior of a Western coal such as Wyodak with AMOCAT type catalysts. A two-month program to determine the feasibility of using the Amoco continuous aging unit for SRC-I product upgrading was outlined. (ERA citation 05:023438)

DOE/ET/14815-6 PC **A02/MF A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Combined Shift and Methanation in a Fluidized-Bed Reactor. Quarterly Progress Report, 1 January 1980-31 March 1980. BCR Report L-1091.
R. C. Streeter. Apr 80, 22p
Contract AC01-79ET14815

Construction of the new bench-scale reactor system was completed during this report period, and the system was put into operation. A bench-scale activity test, using the older life-test apparatus, was conducted to evaluate two samples of a Ni/Mo catalyst with a stoichiometric synthesis gas (H sub 2 /CO = 3/1). One of the samples had been regenerated, by heating in air at 450 exp 0 C, to remove a significant amount of carbon (18 weight percent) that had been deposited in an earlier PEDU test. The activity of the regenerated sample appeared to be equivalent to that of the as-received catalyst. A second life test (also with the older apparatus) was conducted to evaluate the activity and stability of a new catalyst, BCR Lot No. 4438, with a feed gas H sub 2 /CO ratio of 3/1. The catalyst was extremely active, yielding essentially equilibrium conversions at all temperatures in the range of 800 to 1050 exp 0 C. After being heated to 1100 exp 0 F, however, the catalyst was deactivated. This was not unexpected, since the catalyst manufacturer had advised that the maximum operating temperature was 932 exp 0 F. Arrangements have been made to obtain a PEDU-scale sample of this catalyst for further studies in the fluidized-bed reactor. A 5-day PEDU test was conducted using a sample of the BI-GAS pilot plant methanation catalyst. The catalyst remained active throughout the test, even though a post-test analysis showed an accumulation of 2 percent carbon. Useful conversions during the 2/1 and 1/1 peri1/1 periods were 97 and 96 percent, respectively, while product gas methane contents were 92 and 89 percent, respectively, on a CO sub 2 - free, dry basis. (ERA citation 05:021604)

DOE/ET/14940-1 PC **A05/MF A01**
Gulf Research and Development Co., Pittsburgh, PA.
Fundamentals of Coal Depolymerization: Methodology for the In-Situ Investigation of Free Radicals in Coal Depolymerization under SRC-II Preheater/Reactor Conditions. Quarterly Report, October 1-December 31, 1979.
L. Petrakis, D. W. Grandy, R. G. Ruberto, and N. L. Carr. Jan 80, 93p
Contract AC01-79ET14940

The overall scope of this project is to monitor the free radicals during coal depolymerization under SRC-II preheater/reactor conditions. Understanding the nature and behavior of the free radicals may not only provide significant mechanistic information for the depolymerization of coal, but it could also impact the design of coal liquefaction processes. Our uniquely designed apparatus will allow us to monitor free radicals and how they are affected by, among others, short residence times, temperature and pressure changes. All components of Task I have been completed successfully. Specifically, an experimental design for Task II (screening of main process variables) has been developed; a detailed experimental procedure for obtaining data at high pressures and high temperatures has been developed; and the scheme to separate reacted coal has been outlined and tested. As part of the special cavity testing and develop-

ment of experimental procedure, it was determined that data can be obtained 3 to 4 minutes after the initiation of the heating process to achieve a high temperature (450 exp 0 C). Thus, we expect that we will be able to gain significant information on free radical formation and behavior within the first several minutes of subjecting coal to high temperatures and pressures. The free radical concentration can be measured to +-20%. Preliminary results indicate that some of the process variables may cause several-fold changes in the free radicals. A new Varian Associates instrument has been purchased to carry out this work. The next phase of the work will involve the investigation of temperature and pressure effects, heating rate changes, short residence times and the use of process derived solvent. (ERA citation 05:021630)

DOE/LETC/10787-44 PC **A03**/MF **A01**
Geokinetics, Inc., Concord, CA.
Investigation of the Geokinetics Horizontal In Situ Oil Shale Retorting Process. Quarterly Report, January-March 1980.
D. L. Hutchinson. May 80, 43p
Contract FC20-78LC10787

Retort No. 18 produced 3479 barrels of oil during the quarter for a total of 4528 barrels to date. Chromatographic analyses of Retort No. 18 shale oil by the GKI analytical laboratory indicated variation in the oil from the wells near the air-in end and from the air-out end of the retort. Shale oil has been blended with Altamont crude (the Roosevelt refinery's normal feedstock); the distillation, API gravity, pour point, flash point, Naptha and Cat Gas were not affected by the shale oil. The diesel off the crude unit changed from water white to yellow, however, and a fine grayish-brown precipitate formed. Re-entry drilling was performed on Retorts No. 21, No. 22, and No. 23 during the quarter; tracer tests were run by Sandia Laboratories on Retorts No. 19, No. 21, No. 22, and No. 23. Blasthole drilling began on Retort No. 25. (ERA citation 05:023625)

FE-14607-1 PC **A15**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Deactivation and Maintenance Procedures for the Steam-Iron Pilot Plant. Project 61033 Report.
Jan 80, 328p
Contract AC01-79ET14607

The objective of this report is to provide a detailed plan to deactivate, inventory, maintain, and reactivate the Steam-Iron Process pilot plant facility located in Chicago, Illinois. The plant is designed to produce 1.1 million cubic feet of hydrogen per day from 2.2 tons per hour of coal char via the Steam-Iron Process. The facility was deactivated for programmatic reasons by the Department of Energy (DOE) after a 2-year operating period during which the feasibility of producing hydrogen by the Steam-Iron Process was demonstrated. The deactivation plan includes all activities required to: close down, clean, and protect each section of the plant and each component piece of equipment; bring all as-built drawings, maintenance instructions, directions, and logs up to date; inventory all government-owned equipment associated with the project; provide necessary operations, maintenance, and security to protect materials, equipment, and personnel health and safety; provide a secure storage of all pilot plant records that must be maintained at the site; and reactivate plant equipment and facilities. These activities are detailed in the report under four main categories entitled (1) Plant Deactivation Procedures; (2) Government Property Inventory; (3) Plant Property Management, Maintenance, and Security Procedures; and (4) Plant Reactivation Procedures. (ERA citation 05:021918)

FE-1517-89 PC **A03**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Coal Liquefaction Test Center. Annual Report, January 1, 1978-December 31, 1978.
Nov 79, 28p
Contract EX-76-C-01-1517

This is the 1978 annual technical report on the work performed at the Cresap Test Facility, Cresap, West Virginia by Fluor Engineers and Constructors, Inc., and Liquefied Coal Development Corporation for the Department of Energy under Contract EX-76-C-01-1517. The report describes and summarizes the results of all work performed in operating the facility to conducting mechanical component testing during the 1978 calendar year. (ERA citation 05:023440)

FE-1517-90 PC **A03**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Coal Liquefaction Test Center. Quarterly Report, April 1, 1979-June 30, 1979.
Dec 79, 43p
Contract EX-76-C-01-1517

This is the 1979 second quarterly technical progress report on the work performed at the Cresap Test Facility, Cresap, West Virginia by Fluor Engineers and Constructors, Inc., and Liquefied Coal Development Corporation for the Department of Energy under Contract EX-76-C-01-1517. The report describes and summarizes all work performed during the period April 1 through June 30, 1979. The final operational runs of the plant and the initiation of the plant deactivation and preservation work are discussed. (ERA citation 05:023441)

FE-1517-91 PC **A04**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Coal Liquefaction Test Center. Quarterly Report, July 1, 1979-September 30, 1979.
Nov 79, 55p
Contract EX-76-C-01-1517

This is the 1979 third quarterly technical progress report on the work performed at the Cresap Test Facility, Cresap, West Virginia by Fluor Engineers and Constructors, Inc., and Liquefied Coal Development Corporation for the Department of Energy under Contract EX-76-C-01-1517. The report describes and summarizes all work performed during the period July 1 through September 30, 1979. This quarter, essentially all activity was devoted to plant decommissioning and preservation. (ERA citation 05:023442)

FE-1517-92 PC **A03**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Coal Liquefaction Test Center. Annual Report, January 1, 1979-September 30, 1979.
Jan 80, 27p
Contract EX-76-C-01-1517

This is the 1979 annual technical report on the work performed at the Cresap Test Facility, Cresap, West Virginia by Fluor Engineers and Constructors, Inc., and Liquefied Coal Development Corporation for the Department of Energy under Contract EX-76-C-01-1517. The report describes and summarizes the results of all work performed in operating the facility to conduct mechanical component testing during the 1979 calendar year. The report also describes the deactivation, cleanout, and preservation of the facility after the termination of operations in May, 1979. (ERA citation 05:023443)

FE-1793-50 PC **A03**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Coal Feeder Development, Phase III. Progress Report, 1 July 1978-31 December 1978.
J. C. Harding. Jun 79, 30p
Contract EX-76-C-01-1793

This report covers Phase III effort on the Foster-Miller Associates, Inc. Coal Feeder Development Program from 1 July 1978 to 31 December 1978. At the end of this period, the Linear Pocket Feeder had been operated for 234 hours. Problems with the unit have been limited to excessive wear of the conveyor joints. This problem is expected to be relatively easy to solve. Design, fabrication, and assembly of the 500 psig Centrifugal Feeder prototype was completed, and testing of the feeder was initiated. The enlarged feeder test facility (5-ton capacity) was completed. (ERA citation 05:021633)

FE-2006-17 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
Applied Research and Evaluation of Process Concepts for Liquefaction and Gasification of Western Coals.
W. H. Wiser. Mar 80, 12p
Contract EX-76-C-01-2006

The experimental work on coal dissolution in hydrogen donor solvents has been completed. The data are being analyzed and interpretated to explain the major structural features of each high volatile bituminous coal examined. The findings are related to the heterogeneity, polymeric nature, aromaticity, aromatic cluster size and distribution of the clusters in the coal. The results are specific to the particular coal, but agree generally with the current understanding of coal structure. The findings are extensive and quantitative. They have provided valuable new information on liquefaction behavior. The effects of pressure, temperature and contact time on sulfur removal were determined at a constant hydrogen/oil feed ratio of 5000:1 std cc H sub 2 /cc oil, one specific catalyst bed weight (equivalent stationary bed heights of about 5 in.) and one catalyst particle size (49 micron average diameter). Within the chosen operating range, the SRC II allowed smooth and stable operation of the fluid bed without any agglomeration of the catalyst particles. Some typical results are shown. (ERA citation 05:023444)

FE-2038-34 PC **A04**/MF **A01**
Cities Service Co., Tulsa, OK. Technology Assessment Dept.
Expanded Bed Hydroprocessing of Solvent Refined Coal (SRC) Extract. Interim Technical Progress Report on Subtask II, Recycle Operation.
J. D. Potts, K. E. Hastings, and R. S. Chillingworth. May 79, 63p
Contract EX-76-C-01-2038

The feasibility of utilizing an expanded bed reactor (LC-Fining Process) for upgrading SRC-I in a recycle model of operation has been demonstrated with respect to conversion of 850 exp 0 F exp + extract and denitrogenation. The objective of this subtask was to demonstrate that equilibrium recycle solvent could be produced without a concurrent accumulation of refractory, recycled 850 exp 0 F exp + material. The recycle run was made in a fashion that provided an exceptionally high conversion of fresh SRC-I material - approx. 87 weight percent. The demanding goal of producing a 0.3 weight percent nitrogen distillate (390 to 850 exp 0 F) was readily achieved at this high conversion level. Equilibrium recycle solvent (500 to 850 exp 0 F) was produced with a 9 weight percent hydrogen content after two consecutive recycle passes. No buildup of refractory material was discernible when recycling a 500 exp 0 F exp + process stream. A calculated catalyst addition rate of one pound of nickel-molybdenum catalyst per ton of moisture free coal gave a gresh SRC-I conversion of 62 weight percent in the recycle mode of operation and 44.5 weight percent in the once-through mode of operation. This catalyst addition rate was effective in producing a superior quality product to that obtained in competing coal hydroliquefaction processes. (ERA citation 05:021636)

FE-2346-37 PC **A02**/MF **A01**
Dow Chemical Co., Midland, MI.
Ultrasonic Velocity and Elastic Constants of Antrim Oil Shale.
W. D. Wallace, N. Tepley, and R. L. Thomas. Jan 80, 16p
Contract EX-76-C-01-2346

Ultrasonic velocities have been measured in 30 core samples from well 201. Both longitudinal and shear wave velocities were measured across core diameters at thirty degree intervals around the circumference in 22 of the samples. No significant angular variation of ultrasonic velocity was found in any of these. Plots of the average velocities between 1166 feet and 1486 feet are presented. In the Antrim, which lies between 1179 feet and 1422 km/s and the average shear wave velocity is 2.60 km/s. Actual velocities in the Antrim vary by + - 6% from these averages. Just above and below the Antrim the measured velocities are somewhat greater than the average Antrim values. Mass densities have also been determined for these samples and combined with the velocity data to obtain elastic constants. (ERA citation 05:023643)

FE-2346-48 PC **A02**/MF **A01**
Dow Chemical Co., Midland, MI.
In Situ Combustion of Antrim Oil Shale: Field Test of Tejas Petroleum Engineers Burner.
J. L. Cole, and R. K. Pihlaja. Jan 80, 15p
Contract EX-76-C-01-2346

A major problem in having a successful in situ extraction experiment in Antrim oil shale has been the lack of a reliable ignition system. A reliable burner system has now been found. A methane burner was successfully tested for an intermittant 5-day period with a total of 82 hours of burner operation. The burner was ignited at 800 psig (well pressure) and reignited five times. The burner operated during the test at a theoretical gas temperature of 1200 exp 0 F. Increased temperatures are possible with greater fuel to air ratios. The burner was monitored three different ways. Three thermocouples monitored exhaust gas temperature. A sample was taken of exhaust gas and analyzed for CO, CO sub 2 , O sub 2 and unburned hydrocarbons. The burner pressure pulses were monitored by pressure gauges at the surface on the methane supply line. The three different systems gave an indication of whether the burner was operating. The only thing that the burner test idn't investigate was the upper safe operating temperature limit. (ERA citation 05:023626)

FE-2346-64 PC **A03**/MF **A01**
Dow Chemical Co., Midland, MI. Process Development Dept.
Energy from in Situ Processing of Antrim Oil Shale. Quarterly Technical Progress Report, January-March 1980.
L. J. Washington, Jr. 18 Apr 80, 35p
Contract EX-76-C-01-2346

Extraction trials on the new site were continued until the end of the quarter, the maximum length of time provided for in the contract. Trial F80-2, which began November 20, 1979, was terminated in February, 1980. Shale combustion was achieved during this trial and low Btu gas was recovered from production wells and from the injection well during depressurization of the formation after air injection was terminated. However, the proportion of gas recovered was low; possibly due to loss of injection gases through a break in the well casing. Trial F80-3 was carried out in March, 1980, with the burner in Well No. 305 which had not been previously used as an injection well. Good communication existed between Well No. 305 and 306 and initial recovery rates were 85 to 90%. Shale ignition was achieved without difficulty. Analysis of input and output gases gave a good accounting of oxygen and showed that significant quantities of shale were burning. Pressure drop between the input and output wells increased significantly during the period when there was evidence of in situ combustion. Further evaluation of this trial will be completed in the next quarter and will be included in a topical report. (ERA citation 05:023628)

FE-2449-10 PC **A02**/MF **A01**
Carnegie-Mellon Inst. of Research, Pittsburgh, PA.
Studies in Support of Recirculating Bed Reactors for the Processing of Coal. Quarterly Report, 1 June 1979-30 September 1979.
T. W. Bierl, and J. B. Miller. Nov 79, 15p
Contract EX-76-C-01-2449

This program was created to facilitate the application of recirculating bed reactors to the processing of coal. Two aspects of recirculating bed reactor (RBR) technology are addressed by this contract. The first is equipment oriented and the second is process related. Complex physio-chemical phenomena occur at the coal injection point in a process and as a consequence, it is likely that mixing the feed coal with the recycle char will substantially influence the behavior of an RBR. Mixing will affect the amount of agglomerating coal the unit is capable of handling. It may influence the product distribution and it could alter the physical characteristic of the char. Consistent with this viewpoint of recirculating bed reactors, the first contract task is centered on the problem of mixing. The initial phases of the agglomerating coal mixing problem involve the experimental investigation of the mass and heat transfer problems associated with mixing streams containing entrained solids. The goal of the second task is to demonstrate significant organic sulfur reduction in coal by thermal processing in hydrogen and mapping the effect with variations in pressure, temperature, reactor residence time, and feed gas composition in a well-characterized experimental reactor. An experimental reactor called the HDS (hydrodesulfurization) reactor has been constructed for this purpose. The HDS reactor design philosophy is oriented toward obtaining chemistry data - not simulating an RBR. However, there are several areas of dynamic similarity which have been preserved in common with the RBR. Principal among these similarities is a high heating rate of the feed coal. This variable was intentionally preserved because of the influence it can have on the product types and yields. (ERA citation 05:021608)

FE-2859-T1 PC **A03**/MF **A01**
Wormser Engineering, Inc., Middleton, MA.
Multi-Stage Desulfurizing Fluid-Bed Combustor for Coal-Fired Hot Gas Generator Systems. Topical Report No. 1.
W. F. Dawson. Jan 79, 48p
Contract ET-78-C-01-2859

This report covers the design, fabrication and preliminary testing activities of the COHOGG program. The COHOGG system contains a pyrolyzer for partial gasification of the coal through sub-stoichiometric combustion, a char burner which burns the char (generated in the pyrolyzer) in excess air, and an afterburner where the pyrolyzer gases and char burner gases meet to produce a high temperature (approx. 3000 exp 0 F) environmentally clean flame capable of replacing an oil or gas blue flame burner. The system fabrication is complete and preliminary tests results have demonstrated a stable afterburner flame at a temperature up to 1800 exp 0 F with cold air from the char burner side. The char cyclone efficiency is in excess of the 95% required. The char burner has been successfully operated on coal. Initial pollution measurements to be undertaken in the next task will entail operation of the pyrolyzer and char burner together. (ERA citation 05:021648)

LETC/RI-79/11 PC **A03**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Technology Center.
Production of SNG from Shale Oil by Catalytic Gasification in a Steam-Hydrogen Atmosphere.
M. J. Stagner, and L. K. Barker. Dec 79, 26p

This report presents the results from experiments performed at the Laramie Energy Technology Center (LETC) of the Department of Energy (DOE) to produce a substitute natural gas (SNG) from shale oil via catalytic gasification in a steam-hydrogen atmosphere. Also contained is a comparison of the yields of SNG obtained with those from previous experiments performed at LETC in which shale oil was catalytically gasified in a pure hydrogen atmosphere. The maximum yield of gas obtained in the Stream-hydrogen experiments corresponded to 75 wt % of the feed carbon being recovered as gas. This maximum yield was obtained at the highest temperature (1300 exp 0 F (978 exp 0 K)) and hydrogen partial pressure (900 psig (6205 kPa)) tested, while the gas yield for gasification in a pure hydrogen atmosphere was 86 wt % of feed carbon at similar operating conditions. The reduced yield was attributed to poisoning of the cobalt-molybdate catalyst employed by carbon monoxide generated in small amounts from the reaction of steam with carbon and/or hydrocarons in the gasification reactor. (ERA citation 05:023629)

METC-8450-T1 PC **A04**/MF **A01**
Physical Sciences, Inc., Woburn, MA.
Coal Processing for Fuel Cell Utilization. Task XI. Fluidized Bed Coal Gasification Model; Data Analysis and Predictions.
M. L. Finson. Jan 80, 69p TR-209
Contract EW-78-A-21-8450

This report describes development and application of a computational model for fluidized bed gasification of coal. A two phase bubbling bed reactor model accounts for the development of bubbles, clouds, and emulsion, with a new statistical treatment to predict bubble size. Coal char reactivity is described in detail, using models for carbon heterogeneous chemistry, pore struture, and mass transport previously developed at PSI. Volatile release is handled in a semi-empirical manner, and potential gas phase reactions between fuel and oxygen in the bubbles are allowed. The theory yields qualitatively correct trends in comparison to results from the U-GAS pilot plant. However, the data imply larger gas by-passing and particle carryover than predicted, and the computed performance exceeds that observed. The computer program has been exercised to map out gasifier performance over a range of conditions. It is shown that proper fluidization often requires more gas flow than can be accommodated chemically, due to limited kinetics and mass transport. Increasing the bed temperature is beneficial, if not ruled out by coal caking and agglomeration tendencies. Increasing the pressure is not particularly advantageous, but major benefits in terms of off-gas heating value and gasifier efficiency can be obtained by reducing the coal feed size. Potential improvements to the theory are discussed. (ERA citation 05:023428)

PB80-197064 PC **A06**/MF **A01**
Owens-Corning Fiberglas Corp., Toledo, OH.
Demonstration of a Closed Loop Reuse System in a Fiberglas Textile Plant.
Final rept. May 73-Dec 79,
S. H. Thomas, and D. R. Walch. Jan 80, 109p
EPA-600/2-80-040
Grant EPA-S-801173
See also report dated Feb 77, PB-271 990.

The report describes work done toward providing a totally recycled water system for Owens-Corning's textile fiber manufacturing plant at Anderson, SC. (The work was based on pre-1968 pilot plant work by Owens-Corning that resulted in development of totally recycled industrial wastewater systems for all of their insulation manufacturing plants). Water quality requirements for the Anderson plant were considerably more stringent than for insulation manufacturing. Test and engineering design work started in 1973. Design work was completed in March 1977 and actual field work was started. All sanitary wastes from the plant were segregated for separate treatment. Much modification to the existing treatment was required to improve the quality of primary and secondary effluent for tertiary treatment. In the final process, biologically treated effluent is sand-filtered, followed by activated carbon adsorption and disinfection with chlorine. Major items of equipment added were a commercial upflow pressure sand filter and three upflow activated carbon columns with backwash capabilities. The quality of treated effluent is completely satisfactory for all plant operating requirements. Total recycle of treated effluent was realized in mid-1978 and has continued since then. Complete closed-loop operation had not yet been achieved. Discharge to Betsy Creek has been greatly reduced.

PB80-197387 PC **A08**/MF **A01**
Instituto Nacional de Tecnologia Industrial, Buenos Aires (Argentina).
Tecnologia del Caucho Formulaciones (Rubber Technology).
Esteban Friedenthal. 1977, 169p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The processes involved in the manufacture of rubber and some of its raw materials are explained. The theory and practical values of rubber are provided including difficulties that may occur during its preparation. A bibliography is included.

PB80-199060 PC **A18**/MF **A01**
Westinghouse Electric Corp., Lester, PA. Steam Turbine-Generator Technical Operations Div.
A Study to Determine the Commercialization Potential of Open Cycle OTEC Water Plants.
Final rept. Oct 79-Jul 80,
Brian Coffay. Jul 80, 419p MA-RD-940-80076
Contract MA79-SAC-00063

The report surveys the U.S. domestic need for freshwater in regions which are close to an ocean thermal gradient and selects a single site which appears to have the greatest potential for a commercially viable seawater desalination plant to be located in near shore waters. The selected site is St. Croix, U.S. Virgin Islands. A conceptual design for an open cycle ocean thermal energy conversion plant of 15 million gallons per day (expected plant size for plant to be deployed in year 2005) is described and costed. Possible financing options for the plant are described. Capital and operating costs of a conventional multistage flash evaporator and an open cycle ocean thermal energy conversion plant are examined.

PB80-813306 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Waste Processing and Pollution in the Chemical and Petrochemical Industries. 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jun 80,
Diane M. Cavagnaro. Jul 80, 285p
Supersedes NTIS/PS-79/0877 and NTIS/PS-78/0826. See also 1964-1974, NTIS/PS-76/0608, 1975-1976, NTIS/PS-78/0825, and 1977, NTIS/PS-79/0876.

These citations from Federally funded research cover many aspects of waste processing and pollution in the chemical and petrochemical industries. The bibliography includes emissions, economics, control processes, pollution effects, and abatement strategies. (This updated bibliography contains 280 citations, 89 of which are new entries to the previous edition.)

PB80-813330 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Use and Preparation of Industrial Catalysts. 1975-1978 (Citations from the Engineering Index Data Base).
Rept. for 1975-78,
Diane M. Cavagnaro. Jul 80, 197p

The citations from worldwide research cover many aspects of industrial catalysts. Some of the applications to industries such as fuel, plastics, food and elastomers, relate to performance evaluation, metal catalysts, regeneration of the catalysts, surface chemistry, enzymes, pollution control, synthesis, selection of the catalyst, purification, and catalysis. (This updated bibliography contains 222 abstracts, none of which are new entries to the previous edition.)

PB80-813348 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Use and Preparation of Industrial Catalysts. 1979-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1979-Jun 80,
Diane M. Cavagnaro. Jul 80, 87p
Supersedes NTIS/PS-79/0747 and NTIS/PS-78/0727. See also 1970-1974, NTIS/PS-77/0627 and 1975-1978, PB80-813330.

The citations from worldwide research cover many aspects of industrial catalysts. Some of the applications to industries such as fuel, plastics, food and elastomers, relate to performance evaluation, metal catalysts, regeneration of the catalysts, surface chemistry, enzymes, pollution control, synthesis, selection of the catalyst, purification, and catalysis. (This updated bibliography contains 82 citations, 52 of which are new entries to the previous edition.)

SAN-1429-52 PC **A04**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Molten Salt Coal Gasification Process Development Unit. Quarterly Technical Progress Report No. 13, April-June 1979.
M. H. Slater. 30 Sep 79, 56p
Contract EF-77-C-03-1429

This represents the thirteenth quarterly progress report on the Molten Salt Coal Gasification Process Development Unit (PDU) project. The project includes the design, construction, and operation of a PDU which will convert 1 ton of coal per hour into low-Btu gas. The third successful gasification run was performed. The solids feed system, the combustion air system, the gasifier/quench system, the ash removal system, the sulfur removal system, and the sodium carbonate regeneration system were all operated simultaneously as a single, integrated unit. The gasifier was operated at atmospheric pressure for a total of 272 continuous hours. Gas was produced with an average HHV of 88.6 Btu/scf while gasifying coal at a rate of 400 lb/hr. (ERA citation 05:023429)

UCID-18503 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Oil Shale Project Run Summary: Small Retort Run S-14.
F. J. Ackerman, W. A. Sandholtz, J. H. Raley, and L. J. Tripp. Dec 79, 68p
Contract W-7405-ENG-48

Retort run S-14 was a combustion run in the small retort conducted on Nov. 15-16, 1977. The charge of Anvil Points shale operated under a 50% steam - 50% air mixture. Results indicate that the broad particle size range in the packed bed increases nonuniformities in gas flow and bed retorting characteristics. Oil yield was 87%, hydrogen production amounted to 0.25 wt % of the raw shale. (ERA citation 05:009675)

7C. Organic Chemistry

AD-A085 953/8 PC **A02**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Synthesis and Properties of Reactive Diluents for Acetylene Terminated Phenylquinoxaline Oligomers.
Final rept. Apr-Dec 79,
B. A. Reinhardt, and Fred E. Arnold. Apr 80, 23p
Rept no. AFWAL-TR-80-4012

Two reactive diluents, 1-phenoxy-3-(m-ethynylphenoxy) benzene and 1,3-bis-(m-ethynylphenoxy) benzene were synthesized to demonstrate the melt processability of acetylene terminated phenylquinoxaline oligomers. It was shown that tailoring the molecular structure of the diluent to resemble the structure of the oligomer results in a completely compatible system. The reactive diluent lowers the effective softening point of the oligomer, decreases the bulk viscosity during processing and then becomes dormant by co-reacting with the oligomer. (Author)

AD-A085 954/6 PC **A02**/MF **A01**
Texas A and M Univ College Station Dept of Chemistry
A Stable Radical Complex of Phthalocyanine: Green Bisphthalocyaninatoneodymium(III).
Interim rept.,
M. Tsutsui, and K. Kasuga. Jun 80, 9p Rept no. TR-35
Contract N00014-75-C-0417

A stable-neutral radical complex of bisphthalocyaninatoneodymium(III) was prepared by a facile method. The radical is evident from EPR and magnetic susceptibility. (Author)

AD-A085 960/3 PC **A03**/MF **A01**
Texas Univ At Austin Dept of Chemistry
The Synthesis and Reactions of 2,4-Ditertiarybutyl-3-Chloro-1-Lambda(6)-Thia-2,4-Diaza-3-Phosphetidine-1,1-Dioxide, A Heterocycle Containing Nitrogen, Sulfur, and Tricoordinate Phosphorus.
Technical rept.,
Alan H. Cowley, Sushil K. Mehrotra, and Herbert W. Roesky. 16 Jun 80, 27p Rept no. TR-80-01
Contract N00014-76-C-0577

A new four-membered nitrogen-sulfur-phosphorus ring of composition O2S(t-BuN)2PCl has been prepared by the action of PCl3 on the sulfamide, (t-BuNH)2 SO2 in the presence of Et3N and characterized by elemental analysis, and NMR, IR, and mass spectroscopy. Reaction of the title compound with SbF3 and Me3SiNMe2 afforded the 3-fluoro and 3-dimethylamino derivatives, O2S(t-BuN)2PF and O2S(t-BuN)2PNMe, respectively, and treatment with sodium in n-octane produced the diphosphine, (O2S(t-BuN)2P)2. Treatment of the thiadiazaphosphetidine ring with Fe2(CO)9 afforded the phosphorus-iron bonded complex O2S(t-BuN)2P(Cl)Fe(CO)4. (Author)

PAT-APPL-6-130 562 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Process for the Preparation of Phosphonoacetic Acid.
Patent Application,
Peter Blumbergs, and James L. Swigert. Filed 14 Mar 80, 15p PB80-204837
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Phosphonoacetic acid can be prepared by the hydrolysis of trialkylphosphonoacetates in refluxing aqueous hydrochloric acid. Following the reflux period, the bulk of the aqueous hydrochloric acid is removed from the reaction mixture by distillation.

PATENT-4 203 723 Not available NTIS
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Vitra-Violet Process for Producing Flame Resistant Polyamides and Products Produced Thereby.
Patent,
M. S. Toy, and R. S. Stringham. Filed 6 Dec 78, patented 20 May 80, 4p N80-26446/8, PAT-APPL-747 674
Supersedes PAT-APPL-747 674-76, N77-14262 (15 - 05, p 0594). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Aromatic polyamides with improved nonflammability characteristics are produced by contacting a polyamide substrate with a gaseous medium comprising a minor amount of a haloolefinic material and an inert diluent in the presence of light having sufficient energy to effect chemical addition of the haloolefin to the polyamide substrate.

7D. Physical Chemistry

AD-A085 919/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Electron Paramagnetic Resonance in Ferrous Fluosilicate at Submillimeter wavelengths.
Journal article,
Roy S. Rubins, and Harold R. Fetterman. 19 Apr 79, 5p JA-4932, ESD-TR-79-357
Contract F19628-80-C-0002
Pub. in Jnl. of Chemical Physics, v71 n12 p5163-5136, 15 Dec 79. Prepared in cooperation with Texas Univ. at Arlington. Dept. of Physics.

No abstract available.

AD-A085 921/5 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Molecular-Field Coefficients of Tm3Fe5O12.
Journal article,
Gerald F. Dionne, and Paul F. Tumelty. 16 Jul 79, 3p JA-4939, ESD-TR-79-359
Contract F19628-80-C-0002
Pub. in Jnl. of Applied Physics, v20 n12 p8257-8258 Dec 79. Prepared in cooperation with Allied Chemical Corp., Morristown, NJ. Corporate Research Center.

No abstract available.

AD-A085 955/3 PC **A02**/MF **A01**
Texas A and M Univ College Station Dept of Chemistry
The Nuclear Magnetic Resonance Spectra of Bisphthalocyaninatolanthanide (III).
Interim rept.,
M. Tsutsui, and K. Kasuga. Jun 80, 10p Rept no. TR-36
Contract N00014-75-C-0417

The NMR spectra of bisphthalocyaninatolanthanide (III) complexes (La, Nd, Sm, and Eu) have been examined. An effect of a macrocyclic-ring current and induced shift caused by lanthanide (III) ions were discussed. (Author)

AD-A085 959/5 PC **A02**/MF **A01**
Texas A and M Univ College Station Dept of Chemistry
Nitrogen Is Photoelectron Spectra of Octaethylporphyrin (OEP)- and Tetraphenylporphine (TTP)- Complexes of Lanthanides.
Interim rept.,
K. Tatsumi, and M. Tsutsui. Jun 80, 11p Rept no. TR-33
Contract N00014-75-C-0417

The nitrogen Is spectra have been investigated for a series of octaethylporphyrin and tetraphenylporphine complexes of lanthanides. The profile of N Is spectrum for each lanthanide porphyrin showed that the four nitrogen atoms were equivalent in the complex. No significant change was detected between the N Is binding energies of the lanthanide

porphyrins. A good correlation between N ls line width (FWHM) and a number of unpaired electrons in the complex was found. This result implies the presence of exchange interaction between the ionized N ls core and unpaired valence electrons which are delocalized into N valence shells. The spin density on the N atoms must originate from an overlap/covalent interaction between N and metal valence orbitals. (Author)

AD-A085 962/9 PC **A02/MF A01**
Texas A and M Univ College Station Dept of Chemistry
The Structure of Bis(phthalocyaninato)neodymium(III).
Technical rept.,
M. Tsutsui, K. Kasuga, R. C. Pettersen, K. Tatsumi, and N. Van Opdenbosch. Jun 80, 12p
Rept no. TR-34
Contract N00014-75-C-0417

Single crystal X-ray diffraction analysis and X-ray photoelectron spectroscopy have been employed to investigate a bis(phthalocyaninato)-neodymium(III) compound which exhibits electrochromism. A neodymium ion occupies a central position between two parallel but staggered phthalocyanine ligands. An acidic hydrogen may play an important role in electrochromism of the compound, but apparently does not bind strongly to any of the pyrrole nitrogen atoms, in opposition to the structure proposed by Nicholson and Galiaridi. However, a weak interaction between the hydrogen and nitrogen atom(s) cannot be excluded. (Author)

AD-A085 963/7 PC **A02/MF A01**
Naval Weapons Center China Lake CA
Spectra of Pressed Disks of Alkali Halide Whisker Crystals Incorporating Foreign Ions.
Research rept.,
Marian E. Hills, and Allen L. Olsen. Apr 80, 15p
Rept no. NWC-TP-6185

Alkali halide whisker crystals of KCl, KBr, KI, and NaCl were grown readily by allowing aqueous solutions of the salts to pass through porous glass. Whisker crystals of alkali halides doped with MnO4(-), ClO4(-) and ClO3(-) were also grown; not all dopants were used with all host lattices. The whisker crystals may be pressed into disks suitable for obtaining optical spectra. The absorption bands in the spectra of disks pressed from doped whisker crystals were sharper than the spectra of disks pressed from a mechanical mixture of the alkali halide and the dopant. The versatility of the porous glass technique for the growth of whisker crystals is clearly demonstrated. (Author)

AD-A086 071/8 PC **A02/MF A01**
California Inst of Tech Pasadena Div of Chemistry and Chemical Engineering
Fundamental Processes Occurring at Electrodes.
Final rept. 1 May 77-30 Apr 80,
Fred C. Anson. Jan 80, 9p ARO-14577.3-C
Grant DAAG29-77-G-0092

The research program in electrochemistry reported here has concentrated on electrode kinetic studies at low ionic strengths, on methods for attaching molecules to electrode surfaces and on the electrochemical responses obtained from reactants confined to electrode surfaces. Brief summaries of the results obtained in each area are given. (Author)

AD-A086 072/6 MF **A01**
Chicago Univ IL
Thermally Produced Population Inversions and their Consequences.
Final rept. 1 Jan 77-18 Jan 80,
R. Stephen Berry. 30 May 80, 7p ARO-14493.1-C
Grant DAAG29-77-G-0080
Availability: Microfiche copies only.

Alkali halide molecules dissociated by shock waves in gases exhibit population distributions far from equilibrium. The kinetics of the subsequent chemical relaxation have been worked out and the rate coefficients have been determined for many of these ionic molecules. In some cases, the nonequilibrium populations are highly inverted, and in at least two systems, the inverted population has been used to produce light amplification (lasing action) with spectral lines in the visible region. (Author)

AD-A086 075/9 PC **A02/MF A01**
Maine Univ at Orono Dept of Physics
Lattice Gas Models for Chemisorption on Stepped Surfaces.
Technical rept.,
P. Kleban. Jun 80, 15p Rept no. TR-2
Contract N00014-79-C-0441

We consider the theory of chemisorption on stepped surfaces for systems for which a lattice gas in thermodynamic equilibrium is an appropriate model. Using statistical mechanics we demonstrate that by comparing LEED (Low Energy Electron Diffraction) results for flat and stepped substrates one can determine the change in adsorption energy at terrace edges. Thus one can answer the important question of whether adatoms bind more or less strongly at this kind of defect site. We also examine some new and interesting features of LEED spot shapes and integrated intensity behavior for adsorption on stepped substrates when the overlayer is partially disordered. In a companion paper, we consider O on a certain stepped W(110) surface. We demonstrate there, via Monte Carlo calculations, that the binding energy is less strong on either terrace edge for this particular adsorbate, surface and defect. (Author)

AD-A086 116/1 PC **A04/MF A01**
Oklahoma State Univ Stillwater Dept of Physics
A Study of the Defects Produced by the Irradiation of Quartz.
Final technical rept. 15 May 77-30 Nov 79,
Larry E. Halliburton, Joel J. Martin, and William A. Sibley. Apr 80, 74p RADC-TR-80-120
Contract F30602-77-C-0171

We have used infrared absorption (IR), electron spin resonance (ESR), and acoustic loss (Q-1) measurements to investigate the radiation response of high-quality synthetic quartz. Attention was primarily placed on Sawyer Premium Q and Electronic Grade material. Our results show that the radiation-induced mobility of interstitial ions is the principal factor governing the radiation response of quartz. During irradiations below 200 K, IR and ESR results show that hydrogen is the only mobile interstitial. However, if the temperature during irradiation is above 200 K, interstitial sodium and, presumably, the other interstitial alkalis become mobile. This allows Al-OH and A1 sub et)o centers to be formed as the Na(+) ions are removed from the substitutional aluminum sites. Also, the radiation-induced mobility of the Na(+) ions causes the large frequency shifts observed in unswept quartz-controlled oscillators which are subjected to radiation. Electrodiffusion (sweeping) removes the interstitial alkali ions from quartz and replaces them with hydrogen, thus forming Al-OH centers and significantly improving the radiation response of the material. Although the hydrogen is trapped at an aluminum site in the absence of a radiation field, it will be mobile during irradiation at any temperature in these swept crystals. This temporary mobility (i.e., displacement from the stable trapping sites during the irradiation and immediate return to these trapping sites upon cessation of the irradiation) contributes to the transient frequency response of quartz oscillators subjected to radiation pulses.

AD-A086 169/0 PC **A04/MF A01**
Cold Regions Research and Engineering Lab Hanover NH
Preliminary Investigations of the Kinetics of Nitrogen Transformation and Nitrosamine Formation in Land Treatment of Wastewater.
Special rept.,
Stuart Jacobson, and Martin Alexander. Mar 79, 64p Rept no. CRREL-SR-79-4

In laboratory experiments, denitrification of nitrate in wastewater proceeded slowly in an acid soil (pH 4.2), but the rate was fast in soils with pH values of 5.5 to 6.8. The rate of denitrification was governed by the carbon source added, with glucose supporting the fastest rate. The rate was somewhat slower with methanol and succinate and was appreciably slower with secondary effluents as the source of supplemental carbon. Charlton loam supported the more rapid denitrification with glucose as a carbon source, but the rate was higher in Windsor sandy loam with sewage as the carbon source. Denitrification in these soils did not occur at 1 C, and the rate increased with rising temperatures at 7 C, 15 C, 21-22 C and 30 C. Tests of pure cultures of four denitrifying bacteria demonstrated that they needed 0.8 to 2.0 pg of nitrate-N per cell, whereas the requirement was 1.8 to 8.4 pg of nitrate-N per countable denitrifier cell in soil. In addition, the active denitrifying microorganisms in the test soils were characterized. (Author)

AD-A086 206/0 PC **A03/MF A01**
Texas Univ At Austin Dept of Electrical Engineering
New Nonlinear Optical Processes in Molecules at Infrared Frequencies.
Rept. no. 1 (Annual), 30 Sep 78-29 Sep 79,
Michael F. Becker. 1 Nov 79, 32p AFOSR-TR-80-0465
Grant AFOSR-78-3712

This report details progress in the study of optical nonlinearities in molecules at infrared wavelengths. The objectives have been to investigate triply resonant third harmonic generation and singly, two-photon resonant third harmonic generation. In the first area, the limiting process of multiphoton absorption has received emphasis. In the second area, work has concentrated on molecules which have very strong, narrow, two-photon resonances. The successful application of third harmonic generation techniques to study collisionless multiphoton excitation in sulfur hexafluoride was accomplished. Depending on the excitation frequency, one or two-photon processes have been identified which deplete the population of the discrete vibrational energy levels into the quasicontinuum. Similar third harmonic generation experiments have yielded lower conversion efficiency in ammonia than in sulfur hexafluoride. Only a single rotational level in ammonia is found to be resonant, so the susceptibility is only minimally enhanced. In the area of two-photon resonant molecules, the susceptibility and projected conversion efficiency has been calculated for deuterated methane. Because of the very narrow and strong two-photon resonance, the calculated third harmonic conversion is larger than has been observed in any gas phase molecule to date. (Author)

AD-A086 239/1 PC **A02/MF A01**
Indiana Univ At Bloomington Dept of Chemistry
The Molybdenum-Molybdenum Triple Bond. 7.1 Bis(1,3-Di-p-Tolyltriazenido)Tetrakis (Dimethylamido)Dimolybdenum.
Technical rept.,
M. H. Chisholm, D. A. Haitko, J. C. Huffman, and K. Folting. 9 May 80, 14p Rept no. TR-80-1
Contract N00024-76-C-0826

Mo2(NMe2)(6) reacts in hydrocarbon solvents with 1,3-di-p-tolyltriazine, C7H8NNNHC7H8, to give the title compound, Mo2(NMe2)4(C7H8N3C7H8)2, as a red, crystalline solid. An X-ray study shows that in the solid state each molybdenum atom is coordinated to four nitrogen atoms which lie in a plane; there is an unbridged molybdenum-to-molybdenum triple bond with a Mo-Mo distance of 2.212(1) angstroms, and the molecule has crystallographically imposed C2 symmetry. Variable temperature 1H nmr spectra recorded at 220 MHz support the view that this form of the molecule is present in solution.

AD-A086 240/9 PC **A03/MF A01**
Indiana Univ At Bloomington Dept of Chemistry
The Tetradecaisopropoxydihydridotetratungsten Story.
Technical rept.,
M. Akiyama, M. H. Chisholm, F. A. Cotton, M. W. Extine, and D. A. Haitko. 15 May 80, 30p Rept no. TR-80-2
Contract N00024-76-C-0826

Tetradecaisopropoxydihydridotetratungsten, W4(Mu-H)2 (OPr(i))14, has been isolated from the reaction between W2(NMe2)6 (M identical M) and excess isopropanol and has been characterized by ir, nmr, mass spectroscopy and a single crystal X-ray study. The latter reveals a centrosymmetric molecule, (W2(Mu-H)(OPr(i))7)2, having a chain of four tungsten atoms with two short, 2.446(1) angstroms, and one long, 3.407(1) angstroms, tung-

sten-to-tungsten distances. Each tungsten atom is coordinated to five oxygen atoms and a bridging hydride in a distorted octahedral geometry.

AD-A086 255/7 PC A02/MF A01
Columbia Univ New York Dept of Chemistry
Chemically Induced Dynamic Nuclear Polarization from the Selective Recombination of Radical Pairs in Micelles,
Richard S. Hutton, Heinz D. Roth, Bernhard Kraeutler, William R. Cherry, and Nicholas J. Turro. 2 Jan 79, 4p AFOSR-TR-80-0352
Grant AFOSR-78-3502
Pub. in Jnl. of the American Chemical Society, v101 n8 p2227-2228, 11 Apr 79. Prepared in cooperation with Bell Labs., Murray Hill, NJ.

No abstract available.

AD-A086 264/9 PC A03/MF A01
Pennsylvania Univ Philadelphia Dept of Chemistry
Synthesis and Properties of Semiconducting and Metallic Derivatives of Polyacetylene, (CH)x.
Interim technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 25 Sep 78, 33p Rept no. TR-78-8
Contract N00014-75-C-0962

Polyacetylene, (CH)x is the simplest organic polymer. Through chemical doping, the electrical conductivity of films of (CH)x can be varied over twelve orders of magnitude with properties ranging from insulator (sigma less than 10 to the minus 10 ohm to the minus 1 cm to the minus 1) to semiconductor to metal (sigma greater than 10 to the 3rd power ohm to the minus 1 cm to the minus 1). Both donors and acceptors can be used with these flexible, free-standing polycrystalline polymer films (thickness 10 to the minus 5 cm to 0.5 cm) to yield n-type or p-type material. In this review, we summarize some of the more important chemical and physical properties of (CH)x and its doped derivatives. (Author)

BARC-1016 PC A02/MF A01
Bhabha Atomic Research Centre, Bombay (India).
Electronics for Processing of Data from a Double Collector Isotopic Ratio Mass Spectrometer.
V. K. Handu. 1979, 8p
U.S. Sales Only.

The output data available from the mass spectrometer type MS-660 developed in the mass spectrometry section of Technical Physics Division of the Bhabha Atomic Research Centre, Bombay, for the determination of H/D ratios in liquid/gas sample consist of uncompensated mass 3 and mass 2 signals. After the mass 3 signal has been compensated for H sub 3+ formation, the on-line ratio of compensated mass 3 to mass 2 is calculated, displayed, and then printed on a printer for record. The electronic compensation circuit, the discrete voltage-to-frequency (V/F) converter circuit, the ratio calculating system using V/F converters, and a digital interface system for Hindustan Teleprinter to print out the ratios are explained. Results obtained on mass spectrometer MS-660 are presented. (Atomindex citation 11:503118)

BNL-27611 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Use of a Synchrotron Radiation X-Ray Microprobe for Elemental Analysis at the National Synchrotron Light Source.
B. M. Gordon. 1980, 9p CONF-800433-2
Contract EY-76-C-02-0016
International conference on nuclear methods in environment and energy research, Columbia, MO, USA, 14 Apr 1980.

The National Synchrotron Light Source (NSLS) is a facility consisting of a 700 MeV and a 2.5 GeV electron storage ring and dedicated to providing synchrotron radiation in the energy range from the vacuum ultraviolet to high energy x rays. Some of the properties of synchrotron radiation that contribute to its usefulness for x-ray fluorescence are: a continuous, tunable energy spectrum, strong collimation in the horizontal plane, high polarization in the storage ring plane, and relatively low energy deposition. The highest priority is for the development of an x-ray microprobe beam line capable of trace analysis in the parts per million range with spatial resolution as low as one micrometer. An eventual capability for bulk sample analysis is also planned with sensitivities in the more favorable cases beings low as 50 parts per billion in dry biological tissue. The microprobe technique has application to a variety of fields including the geological, medical, materials and environmental sciences. Examples of investigations include multielemental trace analysis across grain boundaries for the study of diffusion and cooling processes in geological and materials sciences samples; in leukocytes and other types of individual cells for studying the relationship between trace element concentrations and disease or nutrition; and in individual particles in air pollution samples. (ERA citation 05:024487)

BUP-100 PC A02/MF A01
Bergen Univ. (Norway). Fysisk Inst.
Atomic Physics with Accelerated Ions. New Aspects in a Developing Research Field.
J. M. Hansteen. Apr 77, 9p
In Norwegian.
U.S. Sales Only.

Some of the aspects of atomic physics which are being brought into focus by the construction of a new generation of heavy-ion accelerators are qualitatively reviewed. Types of processes occurring in the overlapping electron clouds are visualized in an elementary way, and comparisons are made with some recent observations on the possible formation of quasi-molecules and quasi-atoms. In conclusion the view is emphasized that inner-shell ionization phenomena in ion-atom collisions form a bridge between processes of nuclear and atomic origin. (Atomindex citation 11:500662)

CEA-CONF-4529 PC A02/MF A01
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Chimie Appliquee.
Analytical Applications of Laser Source Single Focusing Mass Spectrometry.
A. Cornu. 1977, 13p
U.S. Sales Only.

Element analysis by laser mass spectroscopy is presented. The mass spectrograph and its calibration are described. Some applications are given: local analyses and stratigraphic analyses. (Atomindex citation 11:498893)

CEA-CONF-4530 PC A02/MF A01
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Chimie Appliquee.
Comparison Between a Multichannel and a Sequential X-Ray Fluorescence Spectrometer for Multielement Analysis. Complementarity of the Two Types of Devices.
J. Florestan. 1977, 8p
In French.
U.S. Sales Only.

The possible use of X ray-spectrometers of sequential or multichannel types in differents metallurgical or nuclear industries leads to the comparative evaluations of the characteristics and performances of these devices. The comparisons were made between a new multichannel apparatus and a sequential apparatus operating for a few years. It is shown that the two types of devices are complementary. (Atomindex citation 11:498894)

CONF-791059-8 PC A02/MF A01
Oak Ridge National Lab., TN.
Room Temperature Phosphorimetry for the Analysis of Environmental Systems.
T. Vo-Dinh, and R. B. Gammage. 1979, 16p
Contract W-7405-ENG-26
International symposium on polynuclear aromatic hydrocarbons, Columbus, OH, USA, 2 Oct 1979.

Room Temperature Phosphorimetry (RTP) is a relatively new technique gaining increasing interest among analytical spectroscopists. This technique is based on the detection of the phosphorescence emitted from organic compounds adsorbed on solid substrates at room temperature. In this laboratory, analytical applications of the RTP process have received special attention. Extensive efforts are devoted to developing the usefulness of RTP as a rapid, simple tool for monitoring trace organic pollutants. This paper presents some recent developments and illustrates some practical applications of the technique in the characterization of polynuclear aromatic compounds in synfuel-derived samples. (ERA citation 05:024651)

CONF-791142-7 PC A02/MF A01
Tennessee Univ., Knoxville.
Magnetic Susceptibility of exp 249 Bk Metal.
S. E. Nave, P. G. Huray, and R. G. Haire. 1979, 7p
Contract W-7405-ENG-26
International Conference on crystal field and structural effects in f-electron systems, Philadelphia, PA, USA, 12 Nov 1979.

Magnetic susceptibility measurements have been made on a sample of exp 249 Bk metal using a SQUID micromagnetic susceptometer. (ERA citation 05:023180)

CONF-800205-9 MF A01
Argonne National Lab., IL.
Hyperfine Techniques and EXAFS: Probes of Specific Atomic Environments.
F. Y. Fradin. 1980, 13p
Contract W-31-109-ENG-38
American Institute of Metallurgical Engineers meeting, Las Vegas, NV, USA, Feb 1980.
Microfiche copies only.

Two classes of experimental probes of specific atomic environments: hyperfine interactions and extended x-ray absorption fine structure (EXAFS) are discussed. These techniques are capable of yielding information on the near neighbor atomic environments of specific probe atoms. The information is of two types: static structural information about the numbers, kinds, and locations of nearest neighbor atoms and dynamic information regarding the motion of atoms, which may include localized atomic vibrations or atomic jumps due to diffusion or dislocation motion. The hyperfine technique emphasized is the nuclear magnetic resonance technique which has been highly developed to determine the structure and diffusion properties of exp 1 H, exp 2 D, and exp 3 He in materials. (ERA citation 05:023181)

DOE/ER-0044 PC A17/MF A01
Oak Ridge National Lab., TN.
1978 Bibliography of Atomic and Molecular Processes.
Mar 80, 393p
Contract W-7405-ENG-26

This annotated bibliography lists 2557 works on atomic and molecular processes reported in publications dated 1978. Sources include scientific journals, conference proceedings, and books. Each entry is designated by one or more of the 114 categories of atomic and molecular processes used by the Controlled Fusion Atomic Data Center to classify data. Also indicated is whether the work was experimental or theoretical, what energy range was covered, what reactants were investigated, and the country of origin of the first author. Following the bibliographical listing are indexes of reactants and authors. (ERA citation 05:023187)

DOE/ER/10406-T1 PC A02/MF A01
Illinois Inst. of Tech., Chicago. Dept. of Chemical Engineering.
Selective Metal Ion Extraction for Multiple Ion Liquid-Liquid Exchange Reactions. Progress Report, DE-AS02-79ER 10406.A001.
L. L. Tavlarides. 1980, 23p
Contract AC02-79ER10406

The first phase of selecting a model binary system to study was completed. The system selected is Cu(II), Fe(III) acid sulfate solutions extracted by beta -alkenyl 8-hydroxy quinoline (Kelex 100) in xylene. Maximum copper extraction occurs in less than 5 minutes at 30 to 50 exp 0 C. Thermodynamic chemical equilibrium studies with the Fe(III) ion indicate that the ionic charge of the extracted ion is +3 over a limited pH and concentration range. A simplified equilibrium model did not fit the experimental data. A chemical equilibrium model for the aqueous phase was developed. Kinetic studies on the liquid jet recycle reactor are underway. The model proposed to analyze simultaneous extraction of Cu(II) and Fe(III) in a stirred tank extractor

was reduced to a set of two nonlinear algebraic equations for idealized kinetic expressions. (ERA citation 05:022747)

DOE/ER/10424-T1 PC **A04**/MF **A01**
Kentucky Univ., Lexington. Dept. of Chemistry.
Electron Photoejection in Carbanions. Progress Report, July 1, 1979-June 30, 1980.
L. M. Tolbert. 1980, 65p
Contract AS05-79ER10424

A systematic study was completed of the mechanism of photomethylation of triphenylmethyl anion in dimethyl sulfoxide. The mechanism includes the intervention of an electron transfer as the primary process, followed by a radical + carbanion reaction to lead to a radical anion, which ultimately restores its odd electron to the original triphenylmethyl radical formed. The photochemistry is extremely well behaved; the quantum yield for the process is concentration independent, no chain processes are initiated, and the photoproducts are concentration invariant. The quantum yield of disappearance of triphenylmethyl anion, which is constant from ca. 400 to 600 nm, shows a remarkable increase at shorter wavelengths, which may represent the onset of photoelectrons. (ERA citation 05:022765)

FIAS-R-54 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
(E, 2E) Spectroscopy.
E. Weigold. Sep 79, 13p
U.S. Sales Only.

In (e,2e) or electron coincidence spectroscopy, kinematically complete measurements are made of symmetric ionizing collisions initiated by an electron beam on a gaseous atomic or molecular target. The reaction measures the separation (or binding) energies of electrons in the valence shell an the shapes in momentum space of individual orbitals. It is sensitive to the low to medium momentum region and therefore provides a sensitive measurement of the charge density far from the atomic nuclei. This is the chemically interesting region. It also provides quantitative information on electron correlations in both the initial target and final ion many body states. (Atomindex citation 11:497849)

GEPP-TIS-475 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Determination of Diffusion Rate Parameters in Unequilibrated Systems.
J. F. Kohls. 6 May 80, 43p
Contract EY-76-C-04-0656

A mathematical method of determining the required rate parameters has been developed using the unequilibrated portion of the throughput rate curve. The developed method, termed the stabilized search method, has been verified against both simulated data and actual experimental equilibrated data. Studies performed with simulated permeation data demonstrate that the accuracy of the determined parameters is dependent upon the accuracy of the data used. To quantitatively assess the accuracy of the stabilized search method, several values of diffusivity were used to generate groups of simulated permeation data, each with known solubility and magnitude of random error. The magnitudes of the errors used were chosen to approximate actual experimental permeation rate data. Each group of data was then analyzed using the stabilized search method. The accuracy of the method was evaluated using the calculated diffusivity, solubility, and permeability values in comparison to their actual values. Results showed that the value of diffusivity generated from the data is tolerant of random errors and can be accurately evaluated from data with a 20 percent random error component. The solubility and permeability values are more sensitive to random error. The accuracy to which they can be determined is approximately equal to the random error. Several other modes of error encroachment are discussed and their relative contributions to the possible overall error assessed. A prediction of parameters was made from six sets of experimental permeation data; data was gathered using a leak detector with a 10 to 20% experimental error. Predicted parametric values yield calculated equilibrium throughputs with an average error of 15%. (ERA citation 05:022750)

INIS-mf-4551 MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Twenty Years of the Nuclear Research Institute. II.
V. Vesely. 1978, 249p CONF-7506187-
Scientific and technical conference commemorating the 20. anniversary of the Nuclear Research Institute's foundation, Rez, Czechoslovakia, 10 Jun 1975.
U.S. Sales Only. Microfiche copies only.

Individual abstracts were prepared for the individual papers presented at the conference. (Atomindex citation 09:416363)

INIS-mf-5247 MF **A01**
Vrije Univ., Amsterdam (Netherlands).
High Resolution Atomic-Beam-Laser Spectroscopy of Europium I and Dysprosium I.
G. J. Zaal. 22 Mar 79, 113p
Proefschrift (Dr.).
U.S. Sales Only. Microfiche copies only.

Laser-atomic-beam experiments on the rare earth elements europium and dysprosium are described. Results of hyperfine structure measurements are given and discussed with the help of an effective operator formalism. Isotope shifts are evaluated, and the variation in nuclear parameters, such as changes in nuclear charge radius and nuclear deformation, between isotopes of the same element are extracted. (Atomindex citation 10:483235)

IPPJ-AM-11 PC **A06**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Charge Changing Cross Sections for Heavy-Particle Collisions in the Energy Range from 0.1 EV to 10 MeV, 3. Incidence of F, Ne, Na and Their Ions.
K. Okuno. Dec 78, 115p
U.S. Sales Only.

This paper presents a compilation of the experimental works on charge changing cross sections for neutral atoms and negative and positive atomic ions of atomic numbers Z = 9 - 11 in collisions with atoms and simple molecules. A systematic survey of the literature has been made through October 1977. Some recent data are also included. The result is summarized in graphical form with reference lists attached. (Atomindex citation 11:500688)

IPPJ-AM-9 PC **A08**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Charge Changing Cross Sections for Heavy-Particle Collisions in the Energy Range from 0.1 EV to 10 MeV, 1. Incidence of He, Li, Be, B and Their Ions.
K. Okuno. Dec 78, 170p
U.S. Sales Only.

This paper presents a compilation of the experimental works on charge changing cross sections for neutral atoms and negative and positive atomic ions of atomic numbers Z = 2 - 5 in collisions with atoms and simple molecules. A systematic survey of the literature has been made through October 1977. Some recent data are also included. The result is summarized in graphical form with reference lists attached. (Atomindex citation 11:500689)

IS-M-270 PC **A02**/MF **A01**
Ames Lab., IA.
From Infinity to Zero and Back Again to Infinity (From Mixed Rare Earths to Ultrapure Metals to Pseudo-Lanthanides).
K. A. Gschneidner, Jr. 1979, 11p CONF-790641-13
Contract W-7405-ENG-82
Rare earth research conference, Fargo, ND, USA, 25 Jun 1979.

This paper concerns two topics with which the author is involved. The first is the continuing effort to purify the rare earth metals beyond four nines (99.99 at. %) purity. It appears that we are on the threshold of a major advance - five nines purity on an atomic basis with respect to all the elements in the periodic table. The second topic is the contamination (alloying) of the high purity rare earth metals (99.9 at. %) with each other to form pseudo-lanthanides. The main thrust for this act of madness after all the effort to purify them is to use these pseudo-lanthanides to (1) unravel the various contributions to the heat capacity so that we can better understand the electronic and magnetic nature of the lanthanide elements and their compounds; and (2) to prepare new superconducting compounds, which may have interesting and hopefully useful superconducting properties. (ERA citation 05:022641)

K/ET-433 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Re-Interpretation of the Vapor Pressure Measurements over UF sub 5.
J. M. Leitnaker. 21 Mar 80, 15p
Contract W-7405-ENG-26

There is good reason to suppose the existence of a gaseous molecule of UF sub 5 with UF sub 6 , quite possibly U sub 2 F sub 11 . The supposition is based on recognition of the fact that an increased pressure of gaseous UF sub 6 resulted in increased transport of UF sub 5 . This increased transport was part of an earlier study, but was not recognized. The possible presence of the previously unsuspected molecule supports the repetition of the earlier work. (ERA citation 05:022743)

NIIAR-10(369) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Optimization of Spectrographic Analysis Conditions for Determination of Rare Earths and Yttrium in Graphite Powder.
V. M. Barinov, V. I. Konovalov, T. P. Nemchenko, and A. D. Rabinovich. 1979, 22p
In Russian.
U.S. Sales Only.

Optimum conditions for emission-spectrographic determination of La, Ce, Pr, Nd, Sm, Eu, Gd, Y in graphite powder by means of methods of experiment planning were searched for. Spectral analysis was conducted in the arc of direct current with applying the argon atmosphere and NaF and NaCl carriers. The investigation was carried out in the range of wave lengths of 336-450 nm. A factor experiment was used to optimize the detection limits for the elements. It is established, that optimum conditions are the following: 55 s exposure, 1.34% NaF and 1.22% NaCl concentrations, argon consumption rate of 9 l/min, current intensity of 13.5 A. Elements detection limits are 2x10 exp -9 -3x10 exp -11 g under these conditions. (Atomindex citation 11:501672)

N80-26408/8 PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Submillimeter, Millimeter, and Microwave Spectral Line Catalogue.
R. L. Poynter, and H. M. Pickett. 1 Jun 80, 141p
NASA-CR-163284, JPL-PUB-80-23

A computer accessible catalogue of submillimeter, millimeter, and microwave spectral lines in the frequency range between O and 3000 GHz (such as; wavelengths longer than 100 m) is discussed. The catalogue was used as a planning guide and as an aid in the identification and analysis of observed spectral lines. The information listed for each spectral line includes the frequency and its estimated error, the intensity, lower state energy, and quantum number assignment. The catalogue was constructed by using theoretical least squares fits of published spectral lines to accepted molecular models. The associated predictions and their estimated errors are based upon the resultant fitted parameters and their covariances.

N80-26409/6 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Studies of Thermochemical Water-Splitting Cycles.
Final Report.
R. J. Remick, and S. E. Foh. May 80, 48p NASA-CR-163029, JPL-9950-371
Contracts NAS7-100, JPL-955494

Higher temperatures and more isothermal heat profiles of solar heat sources are developed. The metal oxide metal sulfate class of cycles were suited for solar heat sources. Electrochemical oxidation of SO2 and thermochemical reactions are presented. Electrolytic oxidation of sulfur dioxide in dilute sulfuric acid solutions were appropriate for

metal oxide metal sulfate cycles. The cell voltage at workable current densities required for the oxidation of SO2 was critical to the efficient operation of any metal oxide metal sulfate cycle. A sulfur dioxide depolarized electrolysis cell for the splitting of water via optimization of the anode reaction is discussed. Sulfuric acid concentrations of 30 to 35 weight percent are preferred. Platinized platinum or smooth platinum gave the best anode kinetics at a given potential of the five materials examined.

N80-26451/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Hydrophobic Coating of Solid Materials by Plasma-Polymerized Thin Film Using Tetrafluoroethylene.
K. Hozumi, K. Kitamura, and T. Kitade. Mar 80, 17p NASA-TM-75778
Contract NASW-3199
Transl. into English from Yakugaku Zasshi (Japan), V. 99, No. 5, 1979 p 521-527. Transl. By Kanner (Leo) Associates, Redwood City Original DOC. Prepared by Kyoto Coll. Of Pharm.

Glass slides were coated with plasma-polymerized tetrafluoroethylene films of different thickness using the glow discharge technique in a tube-shaped chamber, and the plasma conditions, film growth rates, light permeability of the polymer films, and particle bond strength in the polymer films were studied. Ashed sections of mouse organs and ashed bacillus spores were also coated to give them hydrophobic treatment without damaging their shapes or appearance. The hydrophobic coating of the specimens was successful, and the fine ash patterns were strongly fixed onto the glass slides, making permanent preparations.

N80-27164/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Differentiation of Optical Isomers Through Enhanced Weak-Field Interactions.
S. Aronowitz. Jun 80, 13p NASA-TM-81208, A-8212

The influence of weak field interaction terms due to the cooperative effects which arise from a macroscopic assemblage of interacting sites is studied. Differential adsorption of optical isomers onto an achiral surface is predicted to occur if the surface was continuous and sufficiently large. However, the quantity of discontinuous crystal surfaces did not enhance the percentage of differentiation and thus the procedure of using large quantities of small particles was not a viable technique for obtaining a detectable differentiation of optical isomers on an achiral surface.

PAT-APPL-6-037 603 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Hydrogen Isotope Separation.
Patent Application,
J. R. Bartlit, W. H. Denton, and R. H. Sherman. Filed 10 May 79, 8p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Disclosed is a system of four cryogenic fractional distillation columns interlinked with two equilibrators for separating a DT and hydrogen feed stream into four product streams, consisting of a stream of high purity D sub 2 , DT, T sub 2 , and a tritium-free stream of HD for waste disposal. (ERA citation 05:025447)

PAT-APPL-6-143 398 PC **A03**/MF **A01**
Department of the Navy Washington DC
Method and Apparatus for Obtaining Enhanced NMR Signals.
Patent Application,
William B. Moniz. Filed 24 Apr 80, 29p AD-D007 317/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a method and device of NMR spectroscopic analysis of liquids whereby magnetization of the spins of one nuclear species is spin-locked along a certain direction and the spin polarization of this species is transferred to a second species through the modulation of the amplitude and/or phase of rf fields applied to one or both species. The NMR signal can be detected directly from the second species.

PAT-APPL-6-147 412 PC **A02**/MF **A01**
Department of the Navy Washington DC
Thermochemical Energy Transport Process.
Patent Application,
Talbot A. Chubb. Filed 6 May 80, 16p AD-D007 315/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The CO2-CH4 reforming-methanation chemical cycle provides an attractive means of transporting energy, such as solar energy, from the place of generation to the place of use. CO2/CH4 molar ratios of 2.0-7.0 permit the use of low-temperature pipelines, while lowering the carbon removal temperature of the system. Catalyst specificity is required to provide high methanation reaction temperature without carbon deposition. (Author)

PAT-APPL-6-161 255 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Cell and Method for Electrolysis of Water and Anode Therefor.
Patent Application,
J. R. Aylward. Filed 20 Jun 80, 20p N80-26406/2, NASA-CASE-MSC-16394-1
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrolytic cell for the conversion of water vapor to oxygen and hydrogen is disclosed. The electrolytic converter includes an anode comprising a foraminous conductive metal base member having a coating thereon of 65-85 weight percent iridium oxide and 15-35 weight percent of a high temperature resin binder. Also included are a matrix member and a cathode, with the matrix member containing an electrolyte and the cathode being substantially inert to the electrolyte. The foraminous metal member is most desirably expanded tantalum mesh, and the cell desirably includes reservoir elements of porous sintered metal in contact with the anode to receive and discharge electrolyte to the matrix member as required. Upon entry of a water vapor-containing airstream into contact with the outer surface of the anode and thence into contact with iridium oxide coating, the water vapor is electrolytically converted to hydrogen ions and oxygen with the hydrogen ions migrating through the matrix to the cathode and the oxygen gas produced at the anode to enrich the air stream passing by the anode.

PATENT-4 201 955 Not available NTIS
Department of the Navy Washington DC
Method of Producing Population Inversion and Lasing at Short Wavelengths by Charge Transfer.
Patent,
Raymond C. Elton, and H. Dixon. Filed 22 Mar 78, patented 6 May 80, 4p AD-D007 351/0, PAT-APPL-889 072
Supersedes PAT-APPL-889 072-78, AD-D004 814.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A stimulated emission device operative in the ultraviolet and soft x-ray regions. A high-power infrared laser is focused on a slab target vaporizing the material and generating highly stripped target ions with varying velocities. Just prior to laser initiation, a gaseous environment of helium, hydrogen, argon or neon is injected to surround the target (e.g., carbon) at a pressure of from 1-10 Torr. The injected gas and associated electrons modify and mix the interacting particles originating from the vaporized target. Ion-atom resonance, charge-transfer reactions take place to form excited-state ions to produce amplified stimulated emission in the 300-800 Angstrom region. (Author)

PB80-195878 Not available NTIS
National Bureau of Standards, Washington, DC.
Photoionization Cross Sections Using the Multiconfiguration.
Final rept.,
L. Armstrong, and W. R. Fielder, Jr. 1980, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Physica Scripta 21, p457-461 1980.

The authors discuss the use of the multiconfiguration Hartree-Fock (MCHF) to obtain initial state wave functions for photoionization calculations. An extension of the MCHF, a multiconfiguration V sup (N-1)LS, can be used to obtain final state wave functions such that most intrachannel corrections to these wave functions vanish. Application of these techniques to the rare gases and the Cl are discussed. In the case of Cl, the strong interchannel interactions are included through use of the K-matrix. Excellent agreement between theory and experiment is obtained for the rare gases.

PB80-196785 PC **A04**/MF **A01**
Arizona State Univ., Tempe. Dept. of Chemistry.
Analysis of Houston Aerosol Samples by GC/MS (Gas Chromatography-Mass Spectrometry) Methods.
Final rept. Sep 78-Jun 79,
F. W. Karasek, and M. L. Parsons. Apr 80, 63p EPA-600/2-80-071
Contract EPA-68-02-2961

An analysis procedure developed to give a qualitative and quantitative analysis for organic compounds adsorbed on aerosols collected by Hi-Vol filters was adapted and applied to a similar analysis of aerosols collected by dichotomous filters. Analysis was conducted for five dichotomous samples and two Hi-Vol samples collected in the Houston study. Estimated concentration levels for dichotomous filters of 0.1 to 20 ng/cu m were reported for the 27 organic compounds searched. Compounds detected included carboxylic acid esters, phthalates, n-alkanes and polycyclic aromatic hydrocarbons. The quantities observed in the samples were near the detection limits of the GC/MS-SIM analysis, and blanks of the instrumental system, solvent, procedure and filter elements were necessary to identify artifacts introduced. Filter and solvent blanks contained compounds in the same or higher quantity ranges as did the filter samples, indicating the teflon elements of the dichotomous filters were not cleaned sufficiently prior to use.

PB80-196926 PC **A02**/MF **A01**
National Environmental Research Center, Cincinnati, OH. Methods Development and Quality Assurance Research Lab.
Modification of the Iodimetric Titration Method for the Determination of Bromide and Its Application to Mixed Domestic - Industrial Waste Effluents.
Journal article,
Daniel F. Bender. Jun 75, 7p EPA-600/J-75-001
Pub. in Analyst, v100 p400-404 Jun 75.

The iodimetric titration method for the determination of bromide involves the observation of various color changes, making the method unsuitable for use with samples that are highly colored. A modification is described, which extends the usefulness of the method to highly colored samples, such as sewage and industrial waste effluents. The obvious substitution of a pH meter for indicators was made and the use of standardized concentrations and amounts of reagents added was incorporated into the method. The procedural steps were studied in order to optimize the sensitivity while minimizing interfering side reactions. The modified method was applied to a mixed domestic-industrial waste effluent spiked with bromide and iodide. The experimental details and statistical parameters for samples spiked at different levels are presented.

PB80-196934 PC **A02**/MF **A01**
National Environmental Research Center, Cincinnati, OH. Methods Development and Quality Assurance Research Lab.
Interlaboratory Study of the Cold Vapor Technique for Total Mercury in Water.
Journal article,
J. A. Winter, and H. A. Clements. 1975, 16p EPA-600/J-75-002

Pub. in American Society for Testing and Materials, STP 573 p566-580 1975.

The American Society for Testing and Materials (ASTM) and the U.S. Environmental Protection Agency (EPA) conducted a joint study of the cold vapor technique for total mercury in water, before formal acceptance of the method by each organization. The method employs an acid-permanganate-persulfate oxidation step with heat. Following Youden's design, samples were prepared in pairs as similar yet different concentrates in sealed glass ampuls. Analysts added an aliquot of each to distilled water and to a natural water of choice. Single analyses were made on each sample and recoveries compared.

PB80-197072 PC **A07**/MF **A01**
Catalytic, Inc., Philadelphia, PA.
Control Assay Development: Methodology and Laboratory Verification.
Final rept. Jul 78-Jul 79,
W. F. Longaker, S. M. Hossain, and A. B. Cherry.
Jan 80, 141p EPA-600/7-80-002
Contract EPA-68-02-2167

The report describes Control Assay Development (CAD), a data acquisition program designed to evaluate the potential applicability of various treatment processes for the control of solid, liquid, and gaseous emissions from coal conversion plants. The CAD program described could be used to provide data for evaluating selected treatment technologies for coal conversion wastewaters. Detailed descriptions of all CAD screening procedures and equipment required for outfitting a mobile laboratory are presented. Laboratory tests were conducted to assess the adequacy of the proposed designs and operating procedures, and to verify the use of a dry bacterial culture for biological oxidation studies. A number of design modifications were recommended, based on the laboratory tests. Insufficient benefit is derived from the use of a dry bacterial culture during the bio-oxidation screening procedure to warrant its adoption in the testing procedure.

PB80-197460 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Selected Tables of Atomic Spectra. A: Atomic Energy Levels - Second Edition. B: Multiplet Tables - Ov.
Charlotte E. Moore. May 80, 25p NSRDS-NBS-3-SECT-9
See also report dated Jan 79, PB-291 914. Library of Congress catalog card no. 64-60074. Sponsored in part by Naval Research Lab., Washington, DC.

The present publication is the ninth section of a series being prepared in response to the need for a current revision of two sets of the author's tables containing data on atomic spectra as derived from analysis of optical spectra. As in the previous Sections, Part A contains the atomic energy levels and Part B the multiplet tables. Section 9 includes these data for O V. The form of the presentation is described in detaill in the text to Section I.

PB80-198385 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Physical Sciences and Engineering.
Test for Screening Asbestos,
Walter S. Kim, James W. Carter, II, and Richard E. Kupel. Oct 79, 9p DHEW/PUB/NIOSH-80-110

A colorimetric test was developed to detect the presence of asbestos (1332214) in bulk samples by the formation of color complexes from added magnesium (II) (Mg) and iron (II) (Fe). In the magnesium test, several drops of Mg reagent are added directly to the sample, which is washed with glycerine and mixed with phosphoric acid and sodium hydroxide. A blue color indicates that chrysotile (12001295) may be present. In the iron test, several drops of Fe reagent are added to the sample, which is washed with an acetic and sulfuric acid mixture. Each acid then is added separately, and hydrofluoric acid also is added. A red color indicates the possible presence of amosite (12172735) or crocidolite (12001284). If both tests give a negative response, the probability is low that asbestos is present. If the presence of Mg or Fe is indicated, further analysis to confirm, identify, and quantitate the asbestos is required.

PB80-198401 PC **A04**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Method Development for Determination of Polychlorinated Hydrocarbons in Municipal Sludge.
Final rept.,
Charles F. Rodriguez, William A. McMahon, and Richard E. Thomas. Mar 80, 75p EPA-600/2-80-029
Contract EPA-68-03-2606

The method provides a procedure for analysis of pesticides and PCB's in municipal sludge. The method includes extraction by a centrifuge technique of the chlorinated compounds from the sludge matrix; clean-up of the extract to remove interferences by sulfur precipitation as mercury sulfide, and by gel permeation of florisil chromatography; quantitation of the chlorinated compounds by an electron capture detector with GC chromatrography; and confirmation of the chlorinated compounds by GC/MS/computer. The method provides confirmation of single component pesticides at 0/3 mg of pesticide per Kg of sludges. The recommended extracting solvent is 15% methylene chloride, 2% acetone and 83% hexane.

PB80-199938 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
National Measurement Laboratory, Technical Highlights,
John D. Hoffman. 1979, 122p NBS-SP-572

This publication gives selected highlights of research and other technical activities in the National Measurement Laboratory of the National Bureau of Standards during calendar year 1979. Comprehensive overviews provide the introductions to the activities in the five centers and seven programs of the Laboratory. Listings of the Professional staff in each of these units are also provided.

PB80-200660 Not available NTIS
National Bureau of Standards, Washington, DC.
Electron Ionisation Cross Sections of Excited Atoms and Ions.
Final rept.,
J. A. Kunc. 1980, 16p
Pub. in Jnl. of Physics, B (London). Atomic and Molecular Physics 13, p587-602 1980.

A general approach for calculating cross sections for electron impact ionization of atoms and ions with a single valence electron in either the ground or an excited state is presented. The differential energy exchange cross sections are based on the semiclassical treatments of Burgess and Vriens. The model takes into account direct as well as electron exchange collisions, and also includes interference effects. The motion of an atomic electron in the nl state is represented by the semiclassical energy distribution function. The criterion of validity of the method is given, from this it follows that the theory is applicable to the calculation of the electron impact ionization cross sections for H I, He II, Li III, C IV, N V, O VI, Ne VIII and Ne X. The present results are compared both with experimental data and with other theoretical calculations.

PB80-201247 Not available NTIS
National Bureau of Standards, Washington, DC.
Electron Impact Excitation of the Resonance Transitions of Highly Ionized Atoms of the Be-, Mg-, and Zn-Isoelectronic Sequences.
Final rept.,
S. M. Younger. 1980, 10p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Jnl. of Quantitative Spectroscopy and Radiative Transfer 23, p489-498 1980.

Electron impact excitation collision strengths for the n doublet S singlet S-nsnp singlet P resonance transitions of highly ionized Be, Mg, and Zn-like ions have been computed in the distorted wave approximation, including the effects of exchange and target state correlation. Good agreement is observed between these data and collision strengths computed in the Coulomb-Born and Born approximations at high incident energies. Analytic fits to the distorted wave data are presented.

PB80-201288 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of Single Chain Neutron Scattering in Concentrated Polymer Solutions.
Final rept.,
A. Z. Akcasu, G. C. Summerfield, S. N. Jahshan, C. C. Han, and C. Y. Kim. 1980, 7p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Jnl. of Polymer Science, Polymer Physics Edition 18, p863-869 1980.

For some time there have been measurements of single-chain form factors for small-angle neutron scattering (SANS) in bulk polymers and in concentrated solutions. These were done by mixing a fraction of completely deuterated polymer with the normal polymer. Until recently, it was believed that these experiments had to be performed using a small fraction of deuterated polymer to avoid interchain interference effects. However, the work of Williams et al. has shown that these experiments are better if one uses large fractions of marked polymer and determines both the single chain and interference contributions to the SANS cross section. The authors generalize the technique of Williams et al. somewhat and apply it to the measurement of the radius of gyration of polyisoprene in the bulk.

PB80-808728 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cathodoluminescence. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 66p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of cathodoluminescence in the study of phosphors, semiconducting and other laser materials, solar cell materials, scanning electron microscopy, and, in general, solid state research, is discussed in the cited reports. Included are articles on the physical chemistry of cathodoluminescence. (Contains 50 citations)

PB80-808736 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cathodoluminescence. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 179p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of cathodoluminescence in the study of phosphors, semiconducting and other laser materials, solar cell materials, scanning electron microscopy (SEM), and in general solid state research, is discussed in these abstracts. Citations include articles on the physical chemistry of cathodoluminescence. (Contains 169 citations)

PB80-808777 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chemiluminescence. 1977-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Apr 80,
C. Gilbert Young. May 80, 212p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works describe the use of chemiluminescence for potential chemical laser candidate analyses, combustion studies, measurements of atmospheric properties, and related technical studies. Mention is also made of some biological sources, such as fireflies. (Contains 181 citations)

PB80-808785 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Chemiluminescence. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 162p

Sponsored in part by National Technical Information Service, Springfield, VA.

Various forms of chemiluminescence, including stress-induced, laser-induced, and electrogenerated, are discussed in the cited abstracts. Air pollution measurement instrumentation is described, and measurements of hydrogen peroxide, nitrous oxide, nitric oxide, vinyl chloride and other atmospheric contaminants are delineated. (Contains 150 citations)

PB80-813355 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
X-Ray Fluorescence Analysis. 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-Jun 80,
Diane M. Cavagnaro. Jul 80, 269p
Supersedes NTIS/PS-79/0748 and NTIS/PS-78/0722. See also 1964-1974, NTIS/PS-76/0677.

Techniques, apparatus, equipment design, and applications of x ray fluorescence analysis are cited. The bibliography includes references on the theory, excitation sources and detectors, and data reduction and analysis. (This updated bibliography contains 261 citations, 44 of which are new entries to the previous edition.)

PUC-tn-06/79 PC **A02**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Oxygen Binding to Nitric Oxide Marked Hemoglobin.
S. R. W. Louro, P. C. Ribeiro, and G. Bemski. Apr 79, 13p
U.S. Sales Only.

Electron spin resonance spectra of organic phosphate free human hemoglobin marked with nitric oxide at the sixth coordination position of one of the four hemes allow to observe the transition from the tense (T) to the relaxed (R) conformation, as a function of partial oxygen pressure. The spectra are composites of contributions from alpha sub(T), alpha sub(R) and beta chains spectra, showing the presence of only two conformations: T and R. In the absence of organic phosphates NO binds to alpha and beta chains with the same probability, but in the presence of phosphates NO combines preferentially with alpha chains. The dissociation of NO proceeds at least an order of magnitude faster in T than in R configuration. (Atomindex citation 11:497775)

UCID-15644-79-4 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
General Chemistry Division. Quarterly Report, October-December 1979.
15 Feb 80, 35p
Contract W-7405-ENG-48

Progress is reported on analytical R and D for the nuclear explosives programs (coupling of gas chromatograph, mass spectrometer, and infrared spectrometer; analysis of fluorocarbon FC-86; far-infrared laser development; transient behavior of n-type TiO sub 2 semiconductor photoelectrodes; and impurities on Kevlar 49 fibers) and for the energy programs (on-line mass spectroscopy of oil shale and testing of additives for controlling the scaling of hypersaline geothermal brine). (ERA citation 05:022741)

Y-2205 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Evaluation of a Laser-Induced Fluorescence System for Uranium Analysis.
L. E. White. May 80, 19p
Contract W-7405-ENG-26

A laser-induced fluorescence method for total uranium analysis of industrial process waters, waste waters, and leachates has been evaluated as a possible alternative for the normal, sodium fluoride and lithium fluoride, flame-fusion fluorescence method currently employed. Since the lower reporting limit of the laser fluorometer is on the order of 0.05 mu g/L, samples for normal analysis can usually be diluted from 100 to 1000 fold which virtually eliminates interferences from quenching substances. Also, since the uranium determination is done in aqueous solution, laser-induced fluorescence entirely eliminates the need for organic extraction and the subsequent fusion process. (ERA citation 05:024491)

7E. Radio and Radiation Chemistry

ANL/FPP/TM-129 PC **A03**/MF **A01**
Argonne National Lab., IL.
Gamma Irradiation of Nitrate-Based Salts.
S. R. Breon, N. R. Chellew, R. G. Clemmer, and J. C. Hoh. Mar 80, 32p
Contract W-31-109-ENG-38

An experiment was devised to determine the radiolytic stability of two commercially available candidate salts - Hitec and Draw Temp 430. The salts were exposed to 0.8 x 10 exp 9 R of gamma radiation in the exp 60 Co facility at the Argonne National Laboratory and simultaneously heated to temperatures in excess of 530 exp 0 C. A helium gas stream circulated over the salts was analyzed for decomposition products. It was found that there was no observable thermal or radiolytic decomposition of either salt. Although the exposure was equivalent to only about 1 minute in a controlled thermonuclear reactor, the results were very encouraging and suggest that further experimentation on molten nitrate-based salts is warranted. (ERA citation 05:022738)

CONF-791072-32 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Simultaneous Photoproduction of Hydrogen and Oxygen by Photosynthesis.
E. Greenbaum. 1979, 21p
Contract W-7405-ENG-26
Symposium on biotechnology in energy production and conservation, Gatlinburg, TN, USA, 3 Oct 1979.

These results suggest that the photosynthetic production of hydrogen and oxygen represents an intriguing way to capture and convert solar energy into stored chemical free energy. It is particularly noteworthy that all three of the only known potential, direct photosynthetic water-splitting systems - blue-green algae, green algae, and the chloroplast-ferredoxin-hydrogenase system - have now been shown to photoproduce molecular hydrogen and oxygen simultaneously for prolonged periods of time. The field of hydrogenic photosynthesis is still in its infancy. (ERA citation 05:022764)

ECN-72 PC **A05**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Radiochemical Analysis in the Netherlands. A Bibliography.
H. A. Das. Oct 79, 88p
U.S. Sales Only.

A survey of the Dutch contributions to the literature on radiochemical analysis is presented. The approximately 600 entries are grouped per laboratory and in chronological order. (Atomindex citation 11:501680)

IPNO-TH-79-07 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Remarks of the Orbital Mixing in Muonium and Charmonium.
J. M. Richard. 1979, 10p
U.S. Sales Only.

A recent derivation of the hyperfine quadrupole moment of the orthomuonium is revisited. Expressions are given for the orbital admixture in the first levels. These orbital mixings are also computed by a approximate numerical method which can be useful for the phenomenology of quarkonium systems in potential models. (Atomindex citation 11:498553)

JINR-12-12189 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Replacement Reactions in Benzene and Halogeno-Benzenes by Astatine Atoms Formed in Nuclear Transformation exp 211 RN(EC) Exp 211 At.
L. Vasaros, Yu. V. Norseev, V. A. Khalkin, G. J. Meyer, and K. Berei. 1979, 18p
In Russian.
U.S. Sales Only.

Halogen and hydrogen replacement reactions in gaseous, liquid and solid benzene and halobenzenes by astatine atoms produced via the exp 211 At(EC) exp 211 At nuclear process were investigated. The halogen replacement increases in the order: C sub 6 H sub 5 F, C sub 6 H sub 5 Cl, C sub 6 H sub 5 Br, C sub 6 H sub 5 I while the hydrogen replacement decreases in the same order. The halogen substitution yields were found to be linearly dependent on the bond strength of the halogen. The isomer distribution of halogen replacement products is nearly statistical in all the halobenzenes, independent of the phase. In aniline the hydrogen substitution yeilds were found to be in the same range. The results lead to the conclusion that the replacement reactions of EC-produced exp 211 At in the systems studied are hot homolytic processes, similar to those of hot halogenes formed via(n, gamma) and (n, 2n) nuclear reactions. (Atomindex citation 11:501916)

PB80-199599 PC **A05**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Radiochemical Analysis in the Netherlands. A Bibliography.
H. A. Das. Oct 79, 92p ECN-72

A survey was made of the Dutch contributions to the literature on radiochemical analysis. Some 600 entries are grouped per laboratory and in chronological order.

PNL-SA-7844 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Kilogram-Scale Purification of Americium by Ion Exchange.
E. J. Wheelwright. 1979, 20p CONF-7910108-4
Contract EY-76-C-06-1830
Symposium on separation science and technology for energy applications, Gatlinburg, TN, USA, 30 Oct 1979.

Sequential anion and cation exchange processes have been used for the final purification of exp 241 Am recovered during the reprocessing of aged plutonium metallurgical scrap. Plutonium was removed by absorption of Dowex 1, X-3.5 (30 to 50 mesh) anion exchange resin from 6.5 to 7.5 M HNO sub 3 feed solution. Following a water dilution to 0.75 to 1.0 M HNO sub 3 , americium was absorbed on Dowex 50W, X-8 (50 to 100 mesh) cation exchange resion. Final purification was accomplished by elution of the absorbed band down 3 to 4 successive beds of the same resin, preloaded with Zn exp 2+ , with an NH sub 4 OH buffered chelating agent. The recovery of mixed exp 241 Am- exp 243 Am from power reactor reprocessing waste has been demonstrated. Solvent extraction was used to recover a HNO sub 3 solution of mixed lanthanides and actinides from waste generated by the reprocessng of 13.5 tons of Shippingport Power Reactor blanket fuel. Sequential cation exchange band-displacement processes were then used to separate americium and curium from the lanthanides and then to separate approx. 60 g of exp 244 Cm from 1000 g of mixed exp 241 Am- exp 243 Am. (ERA citation 05:023703)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A085 852/2 PC **A03**/MF **A01**
North Carolina Univ At Wilmington Inst for Marine Biomedical Research
Experimental Studies on Pressure and Temperature Effects on Deep Sea Organisms.
Final rept. 1977-1979,
Robert Y. George. 28 Feb 80, 41p
Contract N00014-76-C-0216

Recent research on high pressure adaptations point out that there is a definite metabolic change when organisms are subjected to increasing hydrostatic pressure. In the model depicting responses of shallow water crustaceans, a pronounced increase in locomotor activity is seen as a hyperactivity syndrome at pressures ranging be-

tween 50 and 80 atm. This stimulatory effect of pressure also induced an intermittent increase in metabolic activity. At pressures ranging from 100-150 atm these shallow water crustaceans show a very pronounced convulsive reaction and beyond 200 atm there is evidence of well defined inhibitory effects of pressure leading to paralysis of the experimental animals. This high pressure inhibition threshold level at 200 atm corresponds with earlier studies revealing inhibitory effects on nerve conduction, enzyme inactivation, and other biochemical changes involving protein structure. It is of interest to find out that low temperature acclimation appears to have an antagonizing effect and therefore, the hyperactivity syndrome as well as the convulsive reactions while under the influence of pressure becomes very less dramatic in crustaceans acclimated to low temperature for long periods (3 months or more). Another important finding resulting from this contract deals with the pressure responses of scavenging deep sea amphipods that occur at depths exceeding 2000 m.

AD-A086 154/2 PC **A07/MF A01**
Naval Ocean Systems Center San Diego CA
Aerial Surveys of Bowhead Whales, North Slope, Alaska.
Final rept. Aug-Oct 79,
D. K. Ljungblad, M. F. Platter-Rieger, and F. S. Shipp, Jr. Feb 80, 134p Rept no. NOSC/TD-314

During 1979 fall aerial surveys (August, September, and October), 134 individual or group sightings of bowhead whales were made in an area ranging from Point Barrow to Demarcation Bay along the North Slope of Alaska and primarily along the 10-fathom line. Of the 249 bowhead whales sighted, one group of six was observed inside the oil lease area near Narwhal Island, and 84 were seen to the north and outsided the oil lease area along the 10-fathom line. No bowhead whales were seen in or about the lease area during the spring (April-May) or the summer (June-July). Behavioral observations and statistical analysis of initial whale headings indicate that the majority of bowhead whales seen during August, September, and October were migrating in an unhurried manner. They were observed heading in many directions, with estimated speeds of 1.0 knot or less and were possibly feeding along the way. Thirteen tapes containing bowhead whale vocalizations of a quality suitable for analysis were recorded. Preliminary analysis indicates that the sounds are of a slightly higher frequency in the fall. The average overall frequency ranges of the spring and fall sounds were 30 to 2000 Hz and 30 to 3500 Hz, respectively. The peak migration began within an 11-day period between 27 September and 7 October 1979, and continued until 17 October 1979. The total numbers of whales traveling through the survey area were estimated (within 95% confidence limits) to be 852 + or - 533 for a 21-day migratory period and 1620 + or - 1051 for an 11-day period.

CEA-CONF-4266 PC **A02/MF A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Application of Nuclear Techniques to the Study of Marine Environment.
P. Bovard, and P. Guegueniat. Dec 77, 2p
In French.
U.S. Sales Only.

No abstract available.

PB80-198112 PC **A08/MF A01**
Woods Hole Oceanographic Institution, MA.
Abstract of Papers Submitted in 1979 for Publication,
Shelley M. Lauzon. May 80, 154p WHOI-80-22

This Summary of Abstracts contains all abstracts submitted for publication during calendar year 1979 by the staff and students of the Woods Hole Oceanographic Institution. Because some of the abstracts may not be published in the journal to which they have been submitted initially, the author has purposely omitted identifying the journals. The volume is intended to be informative, but not a bibliography.

PB80-200058 PC **A03/MF A01**
Cornell Univ., Ithaca, NY. Center for Environmental Research.
The Fate of Nutrients in Streams Draining Organic Soils.
Technical completion rept. Oct 77-Sep 79,
John H. Peverly, and Tom Potter. Apr 80, 43p
W80-05793, OWRT-A-079-NY(1)
Contracts DI-14-34-0001-8034, DI-14-34-0001-9034

Nutrient loads in water, sediment, and aquatic plants were monitored for two years in Oak Orchard Creek, draining in series cultivated organic soils (upstream) and managed wetlands (downstream). The managed wetlands acted as net nutrient sinks for N and P only, and then only for one year, but lost much less nutrient material on an area basis than did other parts of the basin. Elemental composition of the sediments and aquatic plant tissues was high and varied with position in the basin, not season. Plant growth was limited by physical factors. When flow and stream concentrations are low, such as in autumn, the N, P, K, and C released by plant senescence could be a large fraction of total stream load.

PB80-200322 PC **A02**
Woods Hole Oceanographic Institution, MA.
Effect of Nitrogen Source and Growth Rate on Phytoplankton-Mediated Changes in Alkalinity,
Joel C. Goldman, and Peter G. Brewer. c1980, 9p WHOI-CONTRIB-4305, NOAA-80052707
Grant NOAA-04-8-M01-149
Pub. in Limnology and Oceanography, v25 n2 p352-357 1980.

Continuous culture of the marine chrysophyte Dunaliella tertiolecta were grown on four nitrogen sources: NO3(-), NO2(-), NH4(+), and urea. Alkalinity changes were consistent with a simple stoichiometric model in which OH- production is balanced by NO3(-) and NO2(-) uptake, H(+) production is balanced by NH4(+) uptake and no change occurs when the uncharged species urea is assimilated. Neither the influent N concentration nor the growth rate had any effect on the 1:1 stoichiometry between N uptake and alkalinity change. These results preclude the possibility of excretion of an organic acid (e.g., glycolic acid) stronger than carbonic acid. However, excretion of a weak organic acid or a salt of a strong organic acid cannot be ruled out. In general, the results are consistent with the notion that excretion of glycolic acid by healthy marine phytoplankton cells is minimal. (Copyright (c) 1980, by the American Society of Limnology and Oceanography, Inc.)

PB80-201502 PC **A02**
Hawaii Univ., Honolulu.
Molting, Movement, and Dispersion in the Freshwater Prawn 'Macrobrachium rosenbergii',
John B. Peebles. 3 May 79, 12p UNIHI-SG-JC-80-01, NOAA-80052702
Grant NOAA-04-6-158-44114
Pub. in Jnl. of the Fisheries Research Board of Canada, v36 n9 p1080-1088 1979.

Movement and dispersion patterns of the giant freshwater prawn, Macrobrachium rosenbergii, were assessed through sonic tagging and a novel quadrate sampling technique. Females moved greater distances at night than males, and females exhibited a weaker tendency than males to return to a home site.

8B. Cartography

AD-A085 996/7 PC **A05/MF A01**
Computervision Corp Bedford MA
Ft. Belvoir Text Placement System.
Final technical rept.,
S. Handel. 2 Nov 79, 99p ETL-0199
Contract DAAG53-76-C-0172

The objective of the project was to develop a system using off-the-shelf hardware which automates the placement of typeset text on a map. The Final Technical Report documents the results, problems encountered and their solution, conclusions and recommendations, and references used. The Appendices include: Ft. Belvoir Test Plan; Operator's Manual; Computervision's Graphics System Description; and photographs and specifications of the hardware. (Author)

N80-26743/8 PC **A04/MF A01**
Applied Science Associates, Inc., Apex, NC.
A Study of GEOS-3 Terrain Data with Emphasis on Radar Cross Section.
Final Report.
R. W. Priester. May 80, 53p NASA-CR-156865
Contract NAS6-2810

Radar cross sections (RCS) of terrain are studied using GEOS 3 radar altimeter data. Maps of RCS for portions of four east coast states (U.S.A.) are presented and used to draw curves of RCS versus inland distance as measured from the land/sea interface. The results show RCS to decay approximately exponentially with inland distance. The GEOS 3 data are also used to develop curves of RCS seasonal variation for the same regions. Observed variations correlate strongly with local potential evaporation. Results also show that farming operations in the state of North Carolina are observable in the RCS data. A restricted method for determining surface roughness features from saturated average return waveforms for some types of terrain is developed. Sensor bias induced by receiver saturation for certain terrain returns is briefly discussed.

PB80-199631 PC **A03/MF A01**
Department of the Army, Washington, DC.
Universal Polar Stereographic Grid Tables for Latitudes 79 degrees 30 minutes-90 degrees, International Spheroid (Meters). Transformation of Coordinates from Geographic to Grid and from Grid to Geographic.
Jul 58, 32p DA-TM-5-241-9, NOAA-80052204

The manual presents tabulated data as: Universal Grid System, Polar Stereographic Grid System, Spheroid, Notation, Precision of computations, Trigonometric tables, Convergence, Transformation of coordinates, Scale factor and Computation of tables.

PB80-199649 PC **A15/MF A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Table for Latitudes 0-80 degrees, International Spheroid (Meters). Coordinates for 5-Minute Intersections.
Dec 59, 329p DA-TM-5-241-13, NOAA-80052206
See also PB80-199656.

The manual presents tables containing the Universal Transverse Mercator grid coordinates of every 5-minute intersection of latitude and longitude for latitudes 0 degrees to 80 degrees on the International Spheroid. The tables were prepared to obviate the necessity of computing grid coordinates for each mapping project from the basic grid tables.

PB80-199656 PC **A15/MF A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Table for Latitudes 0-80 degrees, Bessel Spheroid (Meters). Coordinates for 5-Minute Intersections.
Dec 59, 329p DA-TM-5-241-14, NOAA-80052207
See also PB80-199649.

The manual presents tables containing the Universal Transverse Mercator grid coordinates of every 5-minute intersection of latitude and longitude for latitudes 0 degrees to 80 degrees on the Bessel Spheroid. The tables were prepared to obviate the necessity of computing grid coordinates for each mapping project from the basic grid tables.

PB80-200165 PC **A11/MF A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Table for Latitudes 0-40 degrees 05 minutes, Everest Spheroid (Meters). Coordinates for 5-Minutes Intersections.
Dec 59, 247p DA-TM-5-241-16, NOAA-80052209

The manual presents tables containing the Universal Transverse Mercator grid coordinates of every 5-minute intersection of latitude and longitude for latitudes 0 degrees to 40 degrees 05' on the Everest Spheroid. The tables were prepared to obviate the necessity of computing grid coordinates for each mapping project from the basic grid tables.

PB80-200173 PC **A11/MF A01**
Department of the Army, Washington, DC.

Universal Transverse Mercator Grid Table for Latitudes 0-40 degrees 05 minutes, Clark 1880 Spheroid (Meters). Coordinates for 5-Minute Intersections.
Dec 59, 247p DA-TM-5-241-15, NOAA-80052208

The manual presents tables containing the Universal Transverse Mercator grid coordinates of every 5-minute intersection of latitude and longitude for latitudes 0 degrees to 40 degrees 05' on the Clarke 1880 Spheroid. The tables were prepared to obviate the necessity of computing grid coordinates for each mapping project from the basic grid tables.

PB80-200181 PC **A12**/MF **A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Tables for Latitudes 0-80 degrees, Belles Spheroid (Meters). Volume I. Transformation of Coordinates from Geographic to Grid.
Jul 58, 273p DA-TM-5-241-5/1, NOAA-80052201
See also Volume 2, PB80-200199.

The manual presents tabulated data as: Tables for Transformation of Coordinates from Geographic to Grid; Tables for the Computation of Convergence; Tables for the Computation of Scale Factor; and Powers of p.

PB80-200199 PC **A12**/MF **A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Tables for Latitudes 0-80 degrees, Bessel Spheroid (Meters). Volume II. Transformation of Coordinates from Grid to Geographic.
Jul 58, 253p DA-TM-5-241-5/2, NOAA-80052202
See also Volume 1, PB80-200181.

The manual presents tabulated data as: Tables for Transformation of Coordinates from Grid to Geographic, Tables for the Computation of Convergence, and Tables for the Computation of Scale Factor.

PB80-200207 PC **A05**/MF **A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid.
Apr 73, 80p DA-TM-5-241-8, NOAA-80052203

This publication is designed to provide the necessary information for the use of the Universal Transverse Mercator grid in Department of the Army surveying and mapping operations. Included are short discussions of recommended procedures for the computations for artillery and engineering surveys, for the preparation of map graticules and grids, and for certain geodetic transformations.

PB80-200330 PC **A13**/MF **A01**
Department of the Army, Washington, DC.
Latitude Functions Clarke 1866 Spheroid, Natural Values of the Meridional Arc A, B, C, D, E, and F Factors Radii of Curvature, R and N.
Dec 60, 281p DA-TM-5-241-18, NOAA-80052210
See also PB80-197205.

The manual presents tabulated data on Natural values of meridional arc, A, B, C, D, E, and F factors, Natural values of Radii of Curvature, N. and R, and Natural Values of the Ratio of Arc to Sine.

PB80-200918 PC **A07**/MF **A01**
Department of the Army, Washington, DC.
Universal Transverse Mercator Grid Table for Latitudes 0-33 degrees, Clark 1866 Spheroid (Meters). Coordinates for 5-Minute Intersections.
Dec 59, 142p DA-TM-5-241-12, NOAA-80052205

The manual presents tables containing the Universal Transverse Mercator grid coordinates of every 5-minute intersection of latitude and longitude for latitudes 0 degrees to 33 degrees on the Clarke 1866 Spheroid. The tables were prepared to obviate the necessity of computing grid coordinates for each mapping project from the basic grid tables.

8C. Dynamic Oceanography

AD-A085 842/3 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Do Sverdrup Transports Account for the Pacific North Equatorial Countercurrent.
Gary Meyers. 21 Jun 78, 6p
Contract N00014-75-C-0152
Pub. in Jnl. of Geophysical Research, v85 nC2 p1073-1075, 20 Feb 80.

No abstract available.

AD-A086 107/0 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Concept Evaluation for Ocean Shear Profiler.
Memorandum rept.,
J. P. Dugan. 11 Apr 80, 19p NRL-MR-4163, AD-E000 435

The concept of an acoustic vorticity meter for use as an oceanographic velocity shear profiler is evaluated. The vorticity measurement minimizes several noise sources including translational components of platform motion which severely degrade more traditional water velocity measurements, and it prewhitens the data. Present technology is capable of yielding a vorticity noise floor of 0.001 per second, or shear of 0.001 m/s/m, in an array size of 50 cm.

AD-A086 178/1 MF **A01**
Naval Oceanographic Office NSTL Station MS
Surface Currents Northwest North Atlantic Ocean and Labrador Sea.
Jan 78, 21p Rept no. NOO-SP-1400-NA-4
Availability: Microfiche copies only.

This atlas, one in a series of 43 regional surface current atlases, is produced to fulfill a need of navy planning staffs and the scientific and industrial communities for the latest available ocean surface current data. These atlases add to the wealth of nautical information upon which operational planning, navigational safety, and shipping economy depend. Rapid production and wide dissemination of this atlas are made possible by the latest computer techniques.

AD-A086 253/2 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Shallow Water Surface Wave Elevation Distributions,
Edward F. Thompson. 18 Nov 79, 6p Rept no. CERC-REPRINT-80-1
Pub. in Jnl. of the Waterway, Port, Coastal and Ocean Division, Proceedings of the American Society of Civil Engineers, v106 nWW2 p285-289 May 80.

No abstract available.

DOE/EV/71030-1 PC **A03**/MF **A01**
Washington Univ., Seattle. Applied Physics Lab.
Long-Term Measurement of Abyssal Currents in the North Pacific. Final Report, July 1, 1973-September 30, 1979.
B. A. Taft. 10 Jan 80, 33p RLO-2225-TA-30
Contract EY-76-S-06-2225-030

Current measurements were made over a 19-month period in the deep Pacific in a region centered at 30 exp 0 30'N, 158 exp 0 W. Current meters were moored at 100 and 1100 m off the bottom in two arrays of six moorings. Each mooring had a meter at 100 m above the bottom, and two moorings included an additional meter at the 1100 m level. Kinetic energy per unit mass of the records (either nine or ten months) varied between 0.7 and 8.5 cm exp 2 s exp -2 ; the mixed time-space average was 2.8 cm exp 2 s exp -2 . Most records showed higher eddy kinetic energies than the mean kinetic energy. The time-space average eddy kinetic energy of 1.6 cm exp 2 s exp -2 is comparable to the lowest values yet measured in the western North Atlantic. The mean vector speed varied from 0.4 to 3.6 cm s exp -1 ; the directions were variable and showed little consistency. Spectral peaks occurred at the two semidiurnal tidal frequencies M2 and S2 and at the diurnal/inertial frequency. In the low-frequency band (below 1/24 h exp -1), there were energetic periods near 70 and 150 days as well as periods that were longer than the period of measurement. The M2 semidiurnal tidal currents were coherent and appear to be consistent with a position of M2 amphidrome at 25 exp 0 N, 135 exp 0 W, which has been proposed by earlier workers. The 150-day oscillation does not fit the dispersion relation for a flat-bottom barotropic Rossby wave with no mean current. However, either topographic effects or a Doppler shift of the frequency by the mean flow can account for the discrepancy. Comparison of records at 1100 and 100 m off the bottom indicated slightly higher speeds at 1100 m; this result differs from many results from the Atlantic. 8 figures, 4 tables. (ERA citation 05:023165)

PB80-195357 PC **A03**/MF **A01**
National Maritime Research Center-Kings Point, NY.
The Use of the Spectral Ocean Wave Model (SOWM) in Predicting Ship Responses.
Technical rept.,
Dan Hoffman. Jul 79, 43p NMRC-KP-192

This report points out the need for better ocean wave data for use in ship design, weather routing of ships and day-to-day vessel operation. The Spectral Ocean Wave Model (SOWM) developed by the Navy's Fleet Numerical Weather Central has shown great promise as a means of routinely providing forecast wave spectra for ship operating purposes. After reviewing other work on the evaluation of the SOWM, this report attempts on type of evaluation -- the comparison of hull stresses and accelerations measured on the SS Lash Italia by its onboard instrumentation with those calculated using directional sea spectra produced by the SOWM and calculated RAOs.

PB80-197601 PC **A15**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Wintertime Convection and Frontal Interleaving in the Southern Ocean.
Doctoral thesis,
John Marrill Toole. Jun 89, 330p WHOI-80-25
Grants NSF-OCE75-14056, NSF-OCE76-82036
Sponsored in part by Grant NSF-OCE77-28355.

The Southern Ocean is considered important in the global thermodynamic balance of the ocean-atmosphere system because large planetary heat losses occur at high latitudes. In Part I, the air-sea interactions and structure of the near surface waters of the Southern Ocean are investigated with a three dimensional numerical model which resolves the annual sea ice oscillation. The characteristics of the surface mixed layer, the temperature minimum layer and the distribution of wintertime sea ice are reproduced well by this model. The model results and direct calculations of air-sea exchanges suggest a southward heat flux must occur across the Antarctic Polar Front, (APF). The lateral water mass transition across the front occurs over a finite sized zone of fluid which is dominated by intrusive finestructure.

PB80-202021 PC **A13**/MF **A01**
National Ocean Survey, Rockville, MD.
Tide Tables 1981 High and Low Water Predictions. East Coast of North and South America Including Greenland.
1980, 291p NOAA-80052710
See also Tables 1980, PB-298 726.

This edition of the Tide Tables, East Coast of North and South America contains full daily predictions for 38 reference ports and differences and other constants for about 2,000 stations in North America, South America, and Greenland. It also contains a table for obtaining the approximate height of the tide at any time, a table of local mean time of sunrise and sunset for every 5th day of the year for different latitudes, a table for the reduction of local mean time to standard time, a table of moonrise and moonset for 8 places, a table of the Greenwich mean time of the Moon's phases, apogee, perigee, greatest north and south and zero declination, and the time of the solar equinoxes and solstices, and a glossary of terms.

PB80-204050 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
On Surface Gravity Wave Spectra Observed in a Moving Frame of Reference.
Technical memo.,
Robert Bryan Long. Jun 79, 40p NOAA-TM-ERL-AOML-38, NOAA-80052903

Spectral analyses of one- or two-dimensional records of sea surface elevation yield one- or two-dimensional encounter spectra that are, in fact,

weighted integrals over the two-dimensional surface wave spectrum. These integral relationships are determined by the type of record and the motion of the observer relative to the water on which the waves are running. The author derives the relevant relationships for uniform translation of the observer at arbitrary velocity and for arrays of discrete or linearly distributed sensors. The problem of estimating the wave spectrum, given the encounter spectrum, is considered in detail for the two cases exemplified by a wave gage array in a current and by a side-looking surface-imaging radar.

8E. Geodesy

AD-A086 011/4 PC **A04**/MF **A01**
Ohio State Univ Columbus Dept of Geodetic Science
A World Vertical Network.
Scientific rept.,
Oscar L. Colombo. Feb 80, 71p DGS-296, SCIENTIFIC-4, AFGL-TR-80-0077
Contract F19628-79-C-0027

Gravimetric data, levelling, and precise position fixes using artificial satellites or the Moon could be combined to estimate the potential difference between benchmarks situated far apart to an accuracy of a few tenths of kgal m. This is substantially better than what can be obtained with tide gauges, which are affected by the stationary sea surface topography. A set of these benchmarks can link national and continental levelling nets into a unified World Vertical Network. (Author)

PB80-202302 PC **A05**/MF **A01**
National Geodetic Survey, Rockville, MD.
The Bruns Transformation and a Dual Setup of Geodetic Observational Equations,
Erik W. Grafarend. Apr 80, 79p NOAA-TR-NOS-85, NGS-16, NOAA-80052901

The Bruns formula, which equates the disturbing gravity potential modulo the length of the normal gravity vector to the height anomaly, is generalized into three dimensions and into horizontal, equatorial, and inertial reference frames. It is applied to formulate the space-like geodetic boundary value problem in geometry and gravity space. The Bruns transform allows a dual setup of geodetic observational equations in a network of mass points, the finite element approximation of the space-like geodetic boundary value problem, in the following sense: The observational equations can be expressed rigorously either as a function of geometric coordinate corrections alone without any gravity dependent quantity, or alone as a function of the gravity disturbing potential and its gradients alone without any geometric coordinate correction. For operational purposes, estimable quantities from reference-free observables are studied in geometry, gravity, and vorticity spaces. They correspond to invariants with respect to a linear similarity transformation typified by positional angles and length ratios in various vector spaces. A Cartesian series representation of the gravity potential and its gradients is given--the Cartesian coordinate system is known to be singularity-free--and is used for a unified Cartesian setup of observational equations.

8G. Geology and Mineralogy

DOE/DP/01253-18 PC **A03**/MF **A01**
Nevada Univ. System, Las Vegas. Desert Research Inst.
Thermodynanmic Relations Between Selected Parameters Describing Unsaturated Flow.
C. M. Case. May 80, 47p
Contract AC08-76DP01253

The first law of thermodynamics is applied to unsaturated flow by replacing the usual PdV term (P is pressure and V is volume) for chemical system which appears there by psi d theta/sub s/ (phi is metric suction and theta/sub s/ is the degree of saturation). If the assumption is made that hysteretic behavior of the moisture characteristic can be ignored, all the usual thermodynamic relations can be derived in which P is replaced by phi and V is replaced by theta/sub s/ and the various thermodynamic potentials, internal energy, U, entropy S, and so on, are understood to be normalized to unit void volume of the soil being considered. This leads to a thermodynamically derived theoretical expression for the slope of the moisture characteristic in terms of theta/sub s/, temperature, T, and the thermal expansivity of water, beta /sub l/. When hysteresis is considered, it is shown that for certain types of laboratory experiments the area enclosed by the main branches of the hysteresis loop in the phi - theta/sub s/ plane, or by extension any closed loop traversed by the system in the phi - theta/sub s/ plane, represents, to the extent that the sample temperature is kept constant during the adsorption-desorption process, the void volume of the sample multiplied by the integral of the temperature and the differential of the entropy generated by carrying out the cyclic adsorption-desorption process. These results when combined with an explicit representation of phi in terms of an integral over the poor radius distribution allow an explicit calculation of the entropy change in terms of physical parameters. (ERA citation 05:024780)

DOE/RL/01830-14 PC **A05**/MF **A01**
Batelle Project Management Div., Columbus, OH. Office of Nuclear Waste Isolation.
Report on Geologic Exploration Activities.
J. Breslin, R. B. Laughon, R. J. Hall, and J. W. Voss. Jan 80, 83p
Contract EY-76-C-06-1830

This report provides an overview of the geological exploration activities being carried out as part of the National Waste Terminal Storage (NWTS) Program, which has been established by the US Department of Energy (DOE) to develop the technology and provide the facilities for the safe, environmentally acceptable isolation of civilian high-level and transuranic nuclear wastes, including spent fuel elements, for which the Federal government is responsible. The principal programmatic emphasis is on disposal in mined geologic repositories. Explorations are being conducted or planned in various parts of the country to identify potential sites for such repositories. The work is being undertaken by three separate but coordinated NWTS project elements. Under the Basalt Waste Isolation Project (BWIP), basalt formations underlying DOE's Hanford Reservation are being investigated. Granite, tuff, and shale formations at the DOE Nevada Test Site (NTS) are being similarly studied in the Nevada Nuclear Waste Storage Investigations (NNWSI). The Office of Nuclear Waste Isolation (ONWI) is investigating domed salt formations in several Gulf Coast states and bedded salt formations in Utah and Texas. The ONWI siting studies are being expanded to include areas overlying crystalline rocks, shales, and other geohydrologic systems. The current status of these NWTS efforts, including the projected budgets for FY 1981, is summarized, and the criteria and methodology being employed in the explorations are described. The consistency of the overall effort with the recommendations presented in the Report to the President by the Interagency Review Group on Nuclear Waste Management (IRG), as well as with documents representing the national technical consensus, is discussed. (ERA citation 05:021894)

LBL-10166 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Chemistry of Silica in Cerro Prieto Brines.
O. Weres, L. Tsao, and E. Iglesias. Apr 80, 66p
Contract W-7405-ENG-48

The precipitation of amorphous silica from synthetic geothermal brines which resemble the flashed brine at Cerro Prieto has been studied. It was found that part of the dissolved silica quickly polymerizes to form suspended colloidal silica. The colloidal silica flocculates and settles slowly at unmodified brine pH values near 7.35. Raising the pH of the brine to about 7.8 by adding base and stirring for a few minutes causes rapid and complete flocculation and settling. These results have been confirmed in the field using actual Cerro Prieto brine. Both in the laboratory and in the field quaternary amines were found to be effective with some brine compositions but not with others. Polyacrylamides do not work at all. These results suggest the following simple preinjection brine treatment process: age the brine for 10 to 20 minutes in a covered holding tank, add 20 to 30 ppM lime (CaO), stir for 5 minutes, and separate the flocculated silica from the brine using a conventional clarifier. The brine coming out of such a process will be almost completely free of suspended solids. The pilot plant tests needed to reduce this conceptual process to practice are discussed. The rate of deposition of silica scale from synthetic brines was separately studied. It was found that a modest decrease in pH could significantly reduce the scaling rate at a reasonable cost. The equilibrium chemistry of Cerro Prieto brine was studied theoretically. These calculations indicate that increasing the brine pH to remove silica might cause some precipitation of carbonate minerals, but also that this problem could easily be eliminated at a reasonable cost if it did arise. (ERA citation 05:022269)

LBL-10483 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Between-Hole Acoustic Surveying and Monitoring of a Granitic Rock Mass.
B. N. P. Paulsson, and M. S. King. Feb 80, 19p
Contract W-7405-ENG-48

The purpose of this technical note is to present preliminary results of an acoustic monitoring study performed as part of a comprehensive rock mechanic and geophysics research program (Ref.20) associated with large-scale heater tests in an abandoned iron-ore mine in central Sweden. The investigation was performed in a fractured granitic rock mass at a sub-surface depth of 340 m, in a drift adjacent to the original iron-ore mine workings. Acoustic monitoring took place between four empty, dry, vertical boreholes of 10 m depth spaced in the vicinity of a vertical heater borehole in the floor of a drift. (ERA citation 05:023731)

LBL-8907 PC **A08**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Geology and Fracture System at Stripa. Technical Information Report No. 21.
A. Olkiewicz, J. E. Gale, R. Thorpe, and B. Paulsson. Feb 79, 171p SAC-21
Contract W-7405-ENG-48

The Stripa test site has been excavated in granitic rock between 338 m and 360 m below the ground surface, and is located under the north limb of an ENE-plunging synclinal structure. The granitic rocks, in the areas mapped, are of Archean age and are dominated by a reddish, medium-grained, massive monzogranite that shows varying degrees of deformation. The granitic rocks have been intruded by diabase (dolerite) and pegmatite dikes. Surface and subsurface mapping shows that the Stripa granite is highly fractured and that there are at least four joint sets in the area of the test excavations. In addition to the joints, the rock mass contains fissures, fracture zones, and small-scale shear zones, representing the complete spectrum of the fracture family. Most of the fractures are lined with chlorite, occasionally with calcite. Many of the small-scale shear fractures are filled or coated with epidote. Offsets of pegmatite dikes formed by these fractures are usually limited to one to two meters. Water seepage is observed only as drops from fractures or moist fracture surfaces. It was found that reconstruction of the local three-dimensional fracture system is the heater-experiment sites was difficult, and in some cases subjective. Such reconstruction is a prerequisite to accurate interpretation of thermal and mechanical data from such sites. (ERA citation 05:021897)

METC/EGSP-108 MF **A01**
New York State Museum, Albany. Science Service Div.
Isopach MAP of Black Shale in the Sonyea Group (From Well Sample Studies).
D. G. Kamakaris, and A. M. Van Tyne. 1980, 40p
Contract AS21-76MC05206
Microfiche copies only.

A map containing information on black shale deposits in the Sonyea Group in Western New York State was produced from well sample studies. (ERA citation 05:023618)

N80-26977/2 PC **A04**/MF **A01**
Indiana Univ., Bloomington.
The Origin and Evolution of Sulfur in an Archean Volcano-Sedimentary Basin, Deer Lake Area, Minnesota.
M.S. Thesis.

D. L. Nicol. May 80, 61p NASA-CR-163285
Grant NSG-7520

Rocks of the Deer Lake area, northcentral Minnesota, consist of Archean (age greater than 2.6 billion years) metasediments and metavolcanics intruded by mafic layered sills. Geologic and sulfur isotopic data suggest that sulfides in the sediments are bacteriogenic, having formed in response to the activity of sulfate reducing bacteria during diagenesis. Deposition of the sediments appears to have occurred in a deep marine basin with restricted circulation of sea water. The bulk of the sulfur in the igneous rocks is of deep seated origin, but basal contacts of the sills show evidence of assimilation of biogenic sulfur from the intruded sediments. This assimiliation of biogenic sulfur is the primary geochemical control of local Cu-Ni sulfide mineralization.

N80-26978/0 PC **A03**/MF **A01**
Indiana Univ., Bloomington. Dept. of Geology.
Sulfur Isotropic Studies of Archean Slate and Graywacke from Northern Minnesota: Evidence for the Existence of Sulfate Reducing Bacteria.
E. M. Ripley, and D. L. Nicol. 1979, 33p NASA-CR-163286
Grant NSG-7520

Sulfur isotopic studies of pyrite from metasediments in the 2.6 b.y. old Deer Lake greenstone sequence, Minnesota, were conducted in order to evaluate the possible importance of sulfate reducing bacteria in sulfide formation. Pyrite occurs as ovules up to 2 cm in diameter within graphitic slates, and as fine disseminations in metagraywacke units. SEM studies indicate the pyrite is framboidal in morphology. Delta notation values of pyrite from the Deer Lake sediments range from -2.3 to 11.1 0/00, with a peak at approximately +2 o/oo. Isotopic data is consistent with either high temperature inorganic reduction of circulating seawater sulfate, or low temperature bacterial reduction. However, the lack of sulfide bands or massive occurrences in the sediments, the restriction of pyrite mineralization to the sediments, and the absence of evidence for hot spring activity suggest that a diagenetic origin of pyrite is more feasible. Sulfide in such an environment would be produced principally by the action of sulfate reducing bacteria.

N80-26979/8 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
Application of Laser Ranging and VLBI Data to a Study of Plate Tectonic Driving Forces.
Final Report, 1 May 1979 - 30 Apr. 1980.
S. C. Solomon. 30 Apr 80, 111p NASA-CR-163019
Contract NCC5-14, Grant NSG-7329
Presented at Conf. On the Magnitude of Deviatoric Stresses in the Earth's Crust and Upper Mantle, Carmel, Calif., 29 Jul. - 2 Aug. 1979; Sponsored by U.S. Geological Survey.

The conditions under which changes in plate driving or resistive forces associated with plate boundary earthquakes are measurable with laser ranging or very long base interferometry were investigated. Aspects of plate forces that can be characterized by such measurements were identified. Analytic solutions for two dimensional stress diffusion in a viscoelastic plate following earthquake faulting on a finite fault, finite element solutions for three dimensional stress diffusion in a viscoelastic Earth following earthquake faulting, and quantitative constraints from modeling of global intraplate stress on the magnitude of deviatoric stress in the lithosphere are among the topics discussed.

PB80-195670 PC **A13**/MF **A01**
Smithsonian Institution, Washington, DC.
Mineralogy of Carbonatites,
Yu. L. Kapustin. c1980, 276p TT-74-52050
Trans. of mono. Mineralogiya Karbonatitov, Moscow, 1971. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The book examines the structure and regularities of occurrence of complex massifs of ultrabasic rocks and carbonatites, their petrologic features and sequence of formation. It describes in brief their spatial and genetic associations with the other types of rocks. Special attention has been paid to the examination of geological structure, regularities of formation, petrographic features and mineral content of carbonatites. An attempt has been made to systematize available information on all carbonatite provinces of the world and their comparative analysis is given. The book highlights regularities of development of carbonatite bodies, their zonation and formation stage. Two major types of carbonatites--early and late--have been identified and for each of them peculiarities of structure and composition have been indicated. A description of 117 minerals is given, many of which are extremely rare and are typical for the above rocks. Their composition, properties and conditions of occurrence are given.

PB80-201858 PC **A05**/MF **A01**
Woods Hole Oceanographic Institution, MA. Dept. of Geology and Geophysics.
The Use of the Coastal Oceans in the 80's: Opportunities for Marine Geology.
Technical rept.,
David A. Ross, and David G. Aubrey. Apr 80, 85p WHOI-80-19, NOAA-80052713
Grant NA79AA-D-00102

This report presents the results of a workshop held at Woods Hole in October 1979 to consider future uses of the offshore environment and their geological implications. About 60 geologists and marine scientists considered uses of the offshore region: Nuclear Waste Disposal; Sewage; Industrial and Dredge Material Disposal; Offshore Structures; Marine Mining; Hydrocarbon Exploration and Extraction; and Military Related Activities. Scientific, economic, engineering, regulatory, environmental and political aspects for each of these uses were discussed and enumerated. Specific geological subjects were also discussed: slope stability, catastrophic events, sediment characteristics and shelf morphology and bedforms.

PB80-201999 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Environmental Engineering.
Mathematical Models for the Analysis of Management of Non-Point Sources of Nitrogen Pollution.
Project completion rept. Oct 77-Sep 78,
Christine A. Shoemaker, Steven Pacenka, and Keith S. Porter. May 80, 30p W80-05796, OWRT-A-080-NY(1)
Contract DI-14-34-0001-8034

Simulation and optimization models have been developed to evaluate alternative procedures for controlling nitrate pollution of groundwater in eastern Suffolk County, N.Y. The management alternatives considered are restrictions on land development and augmented sewerage. The optimization model has been developed to determine the most economical location of wastewater treatment plants and pipe routes.

PB80-813124 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remote Sensing Applied to Geology and Mineralogy. 1973-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1973-Jul 80,
Audrey S. Hundemann. Aug 80, 192p
Updates NTIS/PS-76/0500. Supersedes NTIS/PS-79/0844 and NTIS/PS-78/0791.

The use of LANDSAT satellites (formerly Earth Resources Technology Satellites (ERTS)) and other remote sensing methods in geological and mineralogical applications is discussed. Abstracts cover rock and soil mapping, terrain analysis, direct and indirect mineral exploration, fault tectonics, and general geologic studies of various countries. A few abstracts pertain to equipment and techniques used in the studies. (This updated bibliography contains 187 citations, 7 of which are new entries to the previous edition.)

PNL-2863 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Glaciological Parameters of Disruptive Event Analysis.
C. Bull. Apr 80, 55p
Contract EY-76-C-06-1830

The possibility of complete glaciation of the earth is small and probably need not be considered in the consequence analysis by the Assessment of Effectiveness of Geologic Isolation Systems (AEGIS) Program. However, within a few thousand years an ice sheet may well cover proposed waste disposal sites in Michigan. Those in the Gulf Coast region and New Mexico are unlikely to be ice covered. The probability of ice cover at Hanford in the next million years is finite, perhaps about 0.5. Sea level will fluctuate as a result of climatic changes. As ice sheets grow, sea level will fall. Melting of ice sheets will be accompanied by a rise in sea level. Within the present interglacial period there is a definite chance that the West Antarctic ice sheet will melt. Ice sheets are agents of erosion, and some estimates of the amount of material they erode have been made. As an average over the area glaciated by late Quaternary ice sheets, only a few tens of meters of erosion is indicated. There were perhaps 3 meters of erosion per glaciation cycle. Under glacial conditions the surface boundary conditions for ground water recharge will be appreciably changed. In future glaciations melt-water rivers generally will follow pre-existing river courses. Some salt dome sites in the Gulf Coast region could be susceptible to changes in the course of the Mississippi River. The New Mexico site, which is on a high plateau, seems to be immune from this type of problem. The Hanford Site is only a few miles from the Columbia River, and in the future, lateral erosion by the Columbia River could cause changes in its course. A prudent assumption in the AEGIS study is that the present interglacial will continue for only a limited period and that subsequently an ice sheet will form over North America. Other factors being equal, it seems unwise to site a nuclear waste repository (even at great depth) in an area likely to be glaciated. (ERA citation 05:021901)

UCRL-52909 PC **A20**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
LLL Continental Drilling for Scientific Purposes Data Base: DOE-Funded Drill Holes.
N. W. Howard, B. J. Qualheim, G. Hage, M. L. Higuera, and G. Pawloski. 26 Feb 80, 456p
Contract W-7405-ENG-48

The investigation of such topics as deep continental basins and basement structures, as well as studies of the earth's crust in general, are dependent on data from deep holes. An information system was set up to collect data from existing and proposed deep drilling holes. This report contains such information about holes that have been drilled, or are planned for drilling, with funding from DOE. Parameters of the data base are described; information for DOE-funded holes forms the bulk of the report. Output of data now in the system is available on request. 3 figures, 2 tables. (ERA citation 05:024782)

8H. Hydrology and Limnology

PB80-197593 PC **A03**/MF **A01**
Geological Survey, Madison, WI. Water Resources Div.
The Effects of Using Ground Water to Maintain Water Levels of Cedar Lake, Wisconsin.
Water-resources investigations (Final),
R. S. McLeod. Apr 80, 42p USGS/WRD/WRI-80/027, USGS/WRI-80-23
Prepared in cooperation with Wisconsin Dept. of Natural Resources, Madison.

Ground water was pumped into Cedar Lake, a kettle lake with no surface inlet or outlet, to evaluate the feasibility of maintaining water levels of lakes in the glaciated kettle moraine area of eastern Wisconsin. The lake is located in a local recharge area within a shallow aquifer system composed of unconsolidated glacial drift of Quaternary age and consolidated bedrock of Silurian age. A water budget for Cedar Lake showed an average inflow of 45 inches per year, including precipitation on the lake surface (28 inches), ground-water seepage to the lake (2 inches), and overland flow (15 inches) to the lake. Outflow averaged aproximately 49 inches per year, and consisted of evaporation (31 inches) from the lake surface and ground-water seepage from the lake (18 inches).

PB80-197809 PC A04/MF A01
Case Western Reserve Univ., Cleveland, OH. Dept. of Earth Sciences.
A Two-Mode Free-Surface Numerical Model for the Three-Dimensional Time-Dependent Currents in Large Lakes.
Final rept.,
Y. Peter Sheng, and Wilbert Lick. May 80, 73p
EPA-600/3-80-047
Grant EPA-R-803704

A two-mode, free-surface model based on vertically-stretched coordinates and a vertically-implicit scheme has been developed and applied to Lake Erie under non-stratified conditions. A brief description of the general equations and boundary conditions is first given. The detailed equations for a two-mode, free-surface model are then described. Finite-difference procedures including the finite-difference equations are listed in detail. The model is first applied to idealized basins and then to Lake Erie for two wind conditions.

PB80-198641 PC A05/MF A01
Geological Survey, NSTL Station, MS. Gulf Coast Hydroscience Center.
Calibration of a Distributed Routing Rainfall-Runoff Model at Four Urban Sites Near Miami, Florida.
Water-resources investigations,
W. Harry Doyle, Jr., and Jeffrey E. Miller. Feb 80, 95p USGS/WRD/WRI-80/026, USGS/WRI-80-1

Urban stormwater data from four Miami, FL. catchments were collected and compiled by the U.S. Geological Survey and were used for testing the applicability of deterministic modeling for characterizing stormwater flows from small land-use areas. A description of model calibration and verification is presented for: (1) A 40.8-acre single-family residential area, (2) A 58.3-acre highway area, (3) A 20.4-acre commercial area, and (4) A 14.7-acre multifamily residential area.

PB80-198864 PC A18/MF A01
Geological Survey, Harrisburg, PA. Water Resources Div.
Water Resources Data for Pennsylvania, Water Year 1979. Volume 2. Susquehanna and Potomac River Basins.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Apr 80, 414p USGS/WRD/HD-80/031, USGS-WDR-PA-79-2
See also Volume 3 for 1978, PB80-118888. Prepared in cooperation with Pennsylvania Dept. of Environmental Resources, Harrisburg.

Water resources data for the 1979 water year for Pennsylvania consist of records of discharge and water quality of streams; contents of lakes and reservoirs; and water levels of ground-water wells. This volume contains records for water discharge at 105 stations; contents at 10 lakes and reservoirs; water quality at 27 gaging stations; and water levels at 40 observation wells. Also included are data for 20 crest-stage, 45 low-flow, and 130 water-quality partial-record stations.

PB80-199193 PC A04/MF A01
Michigan Univ., Ann Arbor.
Great Lakes and Marine Waters Center, Annual Report 1978.
1980, 67p NOAA-80052712

The Great Lakes and Marine Waters Center was organized by the Regents of the University of Michigan in 1974 to combine the efforts of several current University programs related to the Great Lakes. At present more than 150 scientists and staff are carrying on research in such areas as the impacts of thermoelectric power plants on aquatic systems; the fate and impact of toxic substances; the relationship of nutrient cycling and loading on productivity; eutrophication processes; the design of monitoring programs; coastal processes; and sedimentary environment. This annual report presents a summary of research activities during 1978.

PB80-199409 PC A16/MF A01
Woods Hole Oceanographic Institution, MA.
Major Element Geochemistry of the Amazon River System.
Doctoral thesis,
Robert Forster Stallard. c1980, 374p WHOI-80-29
Grant NSF-OCE77-27148

Samples of surface waters and precipitation were collected on the Amazon main channel, its major tributaries, and headwater rivers in the Peruvian and Bolivian Andes. Collection was done between 1976 and 1978. The bulk of the samples were obtained during traverses of the Amazon Basin, on the main channel, in the May-July peak discharge period of 1976 and 1977. The intent of the sampling was to identify the dominant processes controlling the chemistry of rivers within the Amazon River system and to quantify the relative importance of these processes.

PB80-199953 PC A05/MF A01
Washington Univ., Seattle. Dept. of Civil Engineering.
Nearshore Impact of Stormwater in Lake Sammamish, Washington.
Final rept.,
E. B. Welch, and M. A. Perkins. Mar 80, 82p
W80-05750, OWRT-B-068-WASH(1)
Contract DI-14-34-0001-7198

The enriching and/or inhibitory effects of stormwater entering the western nearshore of Lake Sammamish on periphytic algal growth in the shallow area and on the lake as a whole was studied from 1976 - 1979. Lake Sammamish is located 20 km east of Seattle, Washington. It has a surface area of 19.8 sq km, with a mean depth of 17.7 m. Lake Sammamish is upper mesotrophic with typical chlorophyll a and phosphorus concentrations for such a trophic state. The western shore was selected as the study site due to the extensive development of the area. Runoff from three subdrainages was used. The runoff from these subdrainages flows through concrete pipes and enters the lake at the shoreline. Both manual and automatic sampling was used.

PB80-199961 PC A12/MF A01
Geological Survey, Albuquerque, NM. Water Resources Div.
Bibliography of Geology and Hydrology, Southwestern New Mexico.
Water-resources investigations,
Ann Finley Wright. Jan 80, 262p USGS/WRD/WRI-80-030, USGS/WRI-80-20

The southwestern part of New Mexico is recognized as a source of abundant and varied natural resources. This bibliography of over 2,700 references concerned with geology, hydrology, chemistry, and geography has been compiled to assist physical science researches in their study and development of this region.

PB80-201379 PC A02
Florida Univ., Gainesville. Coastal and Oceanographic Engineering Lab.
Inlet Stability Solutions for Tributary Inflow,
Francis F. Escoffier, and Todd L. Walton, Jr. Nov 79, 19p NOAA-80052703
Pub. in Jnl. of the Waterway, Port, Coastal and Ocean Division, ASCE, v105 nWW4 Proc. Paper 14964 Nov 79.

Formulas in use relating to the flow of water through tidal inlets do not take into account the joint effects of inertia and tributary inflow that play a significant role in determining the characteristics of many inlets. In a proposed analytical model these two factors are considered where the tributary inflow to the bay causes ebb flow through the inlet to exceed flood flow. The solution method applies to the same type inlets as studied by E.I. Brown and G.H. Keulegan, i.e., inlets that have a bay in which the water rises and falls uniformly over the entire bay area. An additional assumption is that the discharge into and from the inlet is governed by a head loss that is quadratic in velocity.

PB80-201981 PC A05/MF A01
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Water-Management Planning for Illinois Communities.
Special rept. no. 9,
Anne Weeks. Jul 79, 100p UILU-WRC-79-0009, W80-05791
Grant NSF-OSS77-21209

This report is a compilation of the reading materials used in a series of community water-education programs held in 1978. It was written for people who do not have training in water management but who want to understand the issues. The topics include: water conservation, water availability, water quality, management of water systems, economic concerns and financing of water systems, private home water systems, area-wide districts, soil erosion and sedimentation, and the role of water in economic growth. A glossary is included.

PB80-813132 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Remote Sensing Applied to Hydrology. 1964-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jul 80,
Audrey S. Hundemann. Aug 80, 230p
Updates NTIS/PS-76/0500. Supersedes NTIS/PS-79/0845 and NTIS/PS-78/0792.

The use of aerial and satellite imagery in hydrologic studies, including water resources planning and management, is discussed. The abstracts cover remote sensing studies of water quality, soil moisture, floodplain delineation, ice cover, and determination of snow depth and water equivalent. (This updated bibliography contains 225 citations, 15 of which are new entries to the previous edition.)

8I. Mining Engineering

AAEC/E-466 PC A04/MF A01
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Review of Recent Developments in Uranium Extraction Technology.
P. G. Alfredson, R. E. Crawford, and R. J. Ring. Dec 78, 54p
U.S. Sales Only.

Developments in uranium ore processing technology since the AAEC Symposium on Uranium Processing in July 1972 are reviewed. The main developments include the use of autogenous or semi-autogenous grinding, beneficiation techniques such as radiometric sorting, flotation, magnetic and gravity separation, strong acid and ferric bacterial leaching processes, solution mining and heap leaching operations, horizontal belt filters for solid-liquid separation, continuous ion exchange processes for use with solutions containing up to 8 wt % solids, hydrogen peroxide and ammonia for the precipitation of uranium to improve product yield and purity, and the recovery of by-product uranium from the manufacture of phosphoric acid and copper processing operations. (Atomindex citation 11:499140)

AAEC/E-468 PC A03/MF A01
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Determination of Trace Quantities of Thorium and Uranium in Thick Ore Samples by Proton-Induced X-Ray Emission.
D. D. Cohen, P. Duerden, and E. Clayton. Jul 79, 28p
U.S. Sales Only.

Proton-induced x-ray emission (PIXE) techniques have been used to estimate the concentrations of trace quantities of thorium and uranium in powdered rock and ore samples. Standards of known concentrations were prepared in a carbon matrix and the yields from these used to determine simultaneously the concentrations of thorium and uranium in the ore samples. The experimental detection limit of the technique was found to be 3 to 4 mu g g exp -1 for a 100 mu C irradiation. The appropriate matrix corrections for a carbon and ore matrix have been calculated for thick targets and taken into consideration. (Atomindex citation 11:498892)

AAEC/PR-45U PC A02/MF A01
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Research Establishment Progress Report 1978 - Uranium Fuel Cycle.
Dec 78, 14p
U.S. Sales Only.

Group 8I—Mining Engineering

A report of research programs continuing in the following areas is presented: mining and treatment of uranium ores, uranium enrichment, waste treatment, reprocessing and the uranium fuel cycle. Staff responsible for each project are indicated. (Atomindex citation 11:499143)

CONF-7910155-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Impacts of Deep Geothermal Fluid Production on Shallow Ground-Water Systems.
M. S. Moran. Nov 79, 20p
Contract W-7405-ENG-26
Ground water technology meeting, Oklahoma City, OK, USA, 10 Oct 1979.

Geothermal energy is a nationally minor, but regionally significant, potential source of direct heat and electricity in the United States. In developing hydrothermal systems for energy production, it has been necessary in many cases to assess the potential impacts of reservoir drawdown on groundwater discharge points, such as hot springs and seeps, and gaining reaches of surface streams, because many hydrothermal and shallow groundwater reservoirs are hydraulically communicating systems. The extent of interaction between the deep hydrothermal and shallow groundwater reservoirs, however, has often been underestimated during geothermal exploration. Case studies of hydrothermal exploration and development activities at Coso Hot Springs, California, and Valles Caldera, New Mexico, have indicated that shallow groundwater systems may be affected by geothermal reservoir production. These poential impacts include reduction in quantity and temperature of natural groundwater discharge and water rights and socioreligious issues. (ERA citation 05:023983)

CONF-791016-6 MF **A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Application of Discriminant Analysis and Generalized Distance Measures to Uranium Exploration.
J. J. Beauchamp, C. L. Begovich, V. E. Kane, and D. A. Wolf. Oct 79, 52p
Contract W-7405-ENG-26
1979 DOE statistical symposium, Gatlinburg, TN, USA, 24 Oct 1979.
Microfiche copies only.

The National Uranium Resource Evaluation (NURE) Project has as its goal estimation of the nation's uranium resources. It is possible to use discriminant analysis methods on hydrogeochemical data collected in the NURE Program to aid in formulating geochemical models which can be used to identify the anomalous regions necessary for resource estimation. Discriminant analysis methods have been applied to data from the Plainview, Texas Quadrangle which has approximately 850 groundwater samples with more than 40 quantitative measurements per sample. Discriminant analysis topics involving estimation of misclassification probabilities, variable selection, and robust discrimination are applied. A method using generalized distance measures is given which enables assigning samples to a background population or a mineralized population whose parameters were estimated from separate studies. Each topic is related to its relevance in identifying areas of possible interest to uranium exploration. (ERA citation 05:021825)

CONF-800517-4 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Land Use Siting Considerations for Hydrothermal Energy Facilities.
K. M. Oakes. 1980, 10p
Contract W-7405-ENG-26
26. annual technical meeting of the Institute for Environmental Sciences, Philadelphia, PA, USA, 11 May 1980.

Hydrothermal resources are described and discussion is focused on some of the land use and social considerations involved in siting hydrothermal power plants. (ERA citation 05:023989)

DOE/BC/10003-2 PC **A05**/MF **A01**
CER Corp., Las Vegas, NV.
Western Gas Sands Porject. Status Report, 1 November 1979-30 November 1979.
1979, 81p
Contract AC08-79BC10003

This report summarizes November, 1979, progress of the government-sponsored projects directed toward increasing gas production from the low-permeability gas sands of the western United States. Coring was completed in the Pacific Transmission Supply Company No. 3-10A Federal well in the Greater Green River Basin, and in the Mapco Rio Blanco Unit No. 11-17F well, Uinta Basin. Projects of the National Laboratories and Energy Technology Centers progressed on schedule in November. Interruptions and shutdowns still plagued the Colorado Interstate Gas Company Miller No. 1 and Sprague No. 1 wells. Gas Producing Enterprises, Inc. Natural Buttes Unit wells continued to flow to sales. All testing has been completed at Mitchell Energy Corporation Muse-Duke No. 1 well. (ERA citation 05:021795)

DOE/BC/10003-4 PC **A03**/MF **A01**
CER Corp., Las Vegas, NV.
Western Gas Sands Project. Quarterly Basin Activities Report, October 1-December 31, 1979.
1979, 47p
Contract AC08-79BC10003

This report is a summation of three months drilling and testing activitie in the four primary study areas of the WGSP: Greater Green River Basin, Northern Great Plains Province, Piceance Basin, and Uinta Basin. (ERA citation 05:021796)

DOE/BC/10003-5 PC **A04**/MF **A01**
CER Corp., Las Vegas, NV.
Western Gas Sands Project. Status Report, 1 January-31 January 1980.
1980, 71p
Contract AC08-79BC10003

This report summarizes January, 1980, progress of the government-sponsored projects directed toward increasing gas production from the low-permeability gas sands of the western United States. The USGS continued activities in the four primary areas of interest in the WGSP; coring and logging of Rainbow Resources No. 1-3 Federal well, Sweetwater County, Wyoming, was completed during January. The DOE Well Test Facility was moved to Wattenberg field to monitor well tests at the Colorado Interstate Gas Company cyclic injection site. Sixteen minifracs were conducted at the Nevada Test Site in conjunction with Sandia Mineback program. (ERA citation 05:021797)

DOE/BETC-80/1 PC **A07**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Contracts for Field Projects and Supporting Research on Enhanced Oil Recovery and Improved Drilling Technology. Progress Review No. 21, Quarter Ending December 31, 1979.
B. Linville. Apr 80, 145p

Individual report are presented of contracts for field projects and supporting research on chemical flooding, CO sub 2 injection, thermal/heavy oil, resource assessment technology, improved drilling technology, residual oil, environment, and petroleum technology. (ERA citation 05:023576)

DOE/EIA-0185(79) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Cost and Indexes for Domestic Oilfield Equipment and Production Operations, 1979.
T. C. Anderson, and V. T. Funk. 6 Feb 80, 92p

Domestic oilfield production equipment and direct annual operating costs and indexes are presented for 1979. Also, linked index numbers for 1977 and 1978 are shown together with the 1978 costs for each component. Costs and indexes for primary operations in six areas, secondary operations in one area, and primary operations in the Gulf Coast offshore area are detailed in the 63 appendix tables. Between midyear of 1978 and midyear 1979, the indexes for equipment costs increased 9.8 percent for primary and 10.1 percent for secondary recovery production. Direct operating costs for these categories rose 8.1 and 8.7 percent, respectively. Offshore operating costs for the 12-month period showed an 18.3 percent increase. The consumer price index for the same period rose 11.8 percent. (ERA citation 05:021769)

DOE/ER/10086-T1 PC **A08**/MF **A01**
Petroleum Training and Technical Services, Norman, OK.
Technical Review of Enhanced Oil Recovery Literature. Final Report.
Apr 80, 155p
Contract FG05-79ER10086

This report represents the work done under DOE grant No. DE-FG05-79ER10086. It reviews the chemical, miscible and thermal areas of enhanced and recovery (EOR) and has produced a comprehensive bibliography and glossary of terms. The analysis looks into several areas of interest, including: screening criteria, process design, variable interaction and reservoir applicability. In this summary section, the following are shown: (1) screening criteria for process selection; (2) screening guide summary for EOR process; and (3) representative schematics of three major process operations. (ERA citation 05:021760)

DOE/ET/28375-1 PC **A11**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Regional Assessment of Geothermal Potential Along the Balcones and Luling-Mexia-Talco Fault Zones, Central Texas. Final Report.
C. M. Woodruff, Jr., and M. W. McBride. May 79, 245p
Contract ET-78-S-05-5864

A region-wide inventory and assessment of aquifers known to yield warm water (greater then 90 exp 0 F, 32 exp 0 C) is presented. This study was conducted to ascertain the potential for obtaining geothermal energy for space heating and water heating. The aquifers investigated include the Hosston/Trinity Sands, the Hensel Sand, the Paluxy Sand, the Edwards Limestone, and the Woodbine Sand. Each aquifer was examined in terms of its stratigraphic and structural framework and its hydrogeological properties. (ERA citation 05:022254)

DOE/ET/28375-1(App.) PC **A05**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Appendix to Regional Assessment of Geothermal Potential Along the Balcones and Luling-Mexia-Talco Fault Zones, Central Texas. Final Report.
C. M. Woodruff, Jr., and M. W. McBride. May 79, 93p
Contract ET-78-S-05-5864

The appendix contains a computer-based index of subsurface control (mainly electric logs) used in interpreting the structural and stratigraphic framework of the region. This index is presented by county in alphabetical order, and for each county there are two pages of information. The first page presents data obtained mostly from the electric log headings (operator, fee, owner, depth, ground elevation, etc.), but it also contains identifying well numbers and a few lithic interpretations. Most of the geologic interpretations, however, are presented on the second page, where the findings regarding each of the aquifers considered during this project are shown. (ERA citation 05:022255)

DOE/ET/28389-1 PC **A05**/MF **A01**
Denver Research Inst., CO.
Subsurface Investigations at the Roosevelt KGRA, Utah. Final Report.
J. Butz, and M. Plooster. Oct 79, 81p
Contract AS08-77ET28389

An investigation of the geothermal reservoir in the Roosevelt Hot Springs Known Geothermal Resource Area in Utah was carried out. The objective of this effort was to develop predictions for well production capacities, based on data taken during field tests and through use of a computer model. In turn, the production information could then be used in design optimization and economic analyses for development of the resource under study. Flow tests of a geothermal well, Utah State 14-2, were conducted. Data consisting of pressure and temperature logs as a function of depth were obtained. Maximum recorded temperature was 503 exp 0 F (262 exp 0 C) and maximum pressure, 954 psia (6.58MPa) as measured under flow conditions. Tests were run at rates up to 580,000 lb/hr

(73.3 kg/sec) total flow. The information gathered during the testing was reduced and compared to results of a predictive computer model. Reservoir conditions in the Roosevelt Hot Springs KGRA are such that two-phase flow exists in the wellbore and, in some cases, also in the reservoir itself. The computer model employed in the analysis reflects current efforts to improve the state-of-the-art in the prediction of two-phase pressure drops in vertical systems. Predictions at flowrates of up to 300,000 lb/hr (38 kg/sec) matched quite well with test data, while modeling at higher flowrates (to maximum tested) showed progressively greater deviation from test data. Cause of the observed degradation is postulated to be the movement of the flash horizon into the reservoir, due to drawdown at high flowrates. (ERA citation 05:022274)

DOE/EV/2856-5 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Separation and Structure Elucidation of Coal Molecule Fragments. Final Report, February 1, 1976-August 31, 1979.
R. V. Schultz, J. W. Jorgenson, M. P. Maskarinec, R. L. Kump, and F. Marli. Jan 80, 27p
Contract EY-76-S-02-2856

Separation and identification of the polynuclear aromatic and aliphatic fractions of solvent-refined coal and its recycle oil were performed using a combination of solvent partition and chromatographic fractionation procedures with glass-capillary gas chromatography/mass spectrometry. Chromatographic profiles were generated for each fraction and some semiquantitative data were also obtained. In total, 146 polynuclear aromatic components of SRC were tentatively identified by their molecular weights, as indicated by the mass spectra of the gas chromatography peaks. In addition, wherever possible, specific isomers have been indicated, based on comparison of spectral characteristics and retention data. Separation and identification of nitrogen-containing aromatics of the recycle oil of SRC was accomplished with a combination solvent partition and capillary gas chromatography with deactivated glass columns. High-precision retention measurements of known pyridine and quinoline derivatives are reported, utilizing parent aza-arenes as retention standards. Both precisely measured retention data and mass spectral information combined lead to positive identification of some compounds in SRC samples. A total of 48 two-membered or three-membered aza-arenes have been tentatively identified in the recycle oil. (ERA citation 05:023453)

DOE/ID/12010-3 PC **A10**/MF **A01**
Idaho State Office of Energy, Boise.
Idaho Geothermal Commercialization Program. Five Site Specific Development Plans: I. Boise-The Capital Mall, II. Weiser Hot Springs, III. Hailey, IV. Fairfield, V. Stanley.
B. Eastlake, and D. McClain. Mar 80, 207p
Contract FC-07-79ID12010

Five papers are included. Separate abstracts were prepared for each one. (ERA citation 05:022247)

DOE/MC/03259-6 PC **A05**/MF **A01**
New Mexico State Univ., Las Cruces. Dept. of Chemical Engineering.
Enhanced Oil Recovery by CO sub 2 Foam Flooding. First Annual Report.
Feb 80, 81p
Contract AC21-78MC03259

An extensive review of the literature revealed that the use of foam to lower the mobility of gases used to displace oil has been considered since 1956. Although early work was related mainly to light hydrocarbons, it is natural to extend the concept to the CO sub 2 flooding process. Samples of foaming agents, compatible with oil reservoir environments, were obtained from major manufacturers. Ninety-three samples were tested both alone and in admixture. The most promising class of additives appears to be ionic surfactants produced by ethoxylation of a linear alcohol followed by sulfation. One of the best, Pluratoam NO-2N was tested in a linear sandpack and found to reduce the mobility of gas relative to water an average of 300-fold. Viscosity measurements of the foam at varying shear rates were made to help explain the dramatic change in gas mobility in the linear flow model. The foam is non-Newtonian but many-fold more viscous than the liquid from which it is generated at all reasonable shear rates. Viscosities exceeding 1000 centipose are routinely obtained. Addition of water-soluble polymers to the foaming liquid greatly enhances the stability of the foam. Five different polymer structures were tested, all of which had a common cellulosic type backbone. Of this group, hydroxypropyl cellulose and zanthan gum appear to be the most promising candidates. The superiority of these polymers lies primarily in their stability at reservoir conditions in the acid environment created when carbon dioxide dissolves in water. (ERA citation 05:023579)

DOE/METC/8215-1 PC **A04**/MF **A01**
Kentucky Geological Survey, Henderson.
Studies of New Albany Shale in Western Kentucky. Final Report.
H. R. Schwalb, and R. L. Norris. Feb 80, 57p
Contract EW-78-S-21-8215

The New Albany (Upper Devonian) Shale in western Kentucky can be zoned by using correlative characteristics distinguishable on wire-line logs. Wells drilled through the shale which were logged by various methods provided a basis for zonation of the subsurface members and units of the Grassy Creek, Sweetland Creek, and Blocher. Structure and isopach maps and cross sections were prepared. The Hannibal Shale and Rockford Limestone were found in limited areas; isopach maps were not made for these members. Samples of cuttings from selected wells were studied in order to identify the contact of the shale with underlying and overlying rock units. A well-site examination of cuttings through the shale section was conducted, and the presence of natural gas was observed in the field. The New Albany Shale has the potential for additional commercially marketable natural gas production. Exploratory drilling is needed to evaluate the reservoir characteristics of the New Albany Shale. (ERA citation 05:021790)

FE-2030-TR20 PC **A07**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Effects of Preoxidation on the Swelling and Softening of Bituminous Coals.
D. J. Maloney, R. G. Jenkins, and P. L. Walker, Jr. Apr 80, 139p
Contract EX-76-C-01-2030

A study was conducted to evaluate the applicability of a DuPont 942-TMA (Thermomechanical Analyzer) dilatometer system for the characterization of the swelling and softening properties of caking coals. The results of this investigation demonstrate the utility of this dilatometer system. Several parameters clearly defined with this unit are characteristic of the plastic transitions occurring upon carbonization. These include softening, dilation and resolidification temperature and volume contraction, expansion and total dilation values. The transition parameters measured with the 942-TMA unit are influenced significantly by coal particle size, dilatometer load, and heating rate. All transition temperatures exhibit marked increases with increasing heating rate. Softening temperatures decrease with increasing load and particle size. Dilation temperatures are essentially independent of dilatometer load effects and resolidification temperatures are independent of load and particle size over the range of conditions used in this study. Volume contraction and expansion values show an increase with decreasing coal particle size. Volume expansion values also exhibit strong heating rate and load dependencies. The results point up the great difficulty involved in obtaining truly fresh unoxidized coal samples. Storage of fine coal particles for extended periods of time in atmospheres with even slight oxygen concentrations show signs of weathering. Exposure of an HVA coal to dry air at ambient temperature has much less effect on subsequent swelling and softening properties than does exposure to moist air. (ERA citation 05:023455)

FE-2030-TR21 PC **A05**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Inorganic Constituents in American Lignites.
M. E. Morgan, R. G. Jenkins, and P. L. Walker. Apr 80, 91p
Contract EX-76-C-01-2030

Both the discrete mineral phases and the ion-exchangeable inorganic components of lignites from Texas, North Dakota, and Montana have been studied. The ion-exchangeable cations and the carboxyl groups with which they are associated were characterized by ion exchange methods utilizing ammonium acetate and barium acetate, respectively. Na, K, Mg, Ca, Sr, and Ba were found to be present in all three coals. It was found that Ca and Mg were the most abundant cations and that 40 to 60% of the carboxyl groups in the raw coals were exchanged with cations. Also, significant variations in the relative and absolute concentrations of all the cations were observed. The discrete mineral phases in these lignites were studied by semiquantitative x-ray diffraction and infrared spectroscopy. The importance of the cations in this analysis was shown when the mineralogical analyses of the low temperature ash of the coals with the cations removed and the raw coals were compared. Results show that up to 50% of the low temperature ash of these raw coals can be attributed to the existence of metal cations and that fixation of sulfur, carbon, and oxygen to form sulfates and carbonates is the major reason for this contribution. (ERA citation 05:023456)

FE-3184-1 PC **A07**/MF **A01**
Energy Interface Associates, Palos Verdes Estates, CA.
Investigation and Analysis of Frozen Coal Handling Problems.
Nov 79, 129p
Contract ET-78-C-01-3184

The winters of 1976-77 and 1977-78 impacted large areas of the United States, particularly the midwestern and northeastern regions, with subzero temperatures and snow that severely disrupted electrical power generation. Coal supply lines, yard handling and internal coal processing were affected by long periods of subfreezing temperatures and abnormal precipitation. An unusual sequence of weather caused storage piles to freeze to depths of several feet. Loaded hopper cars froze throughout, creating, in effect, 100-ton ice cubes. Difficulties in reclaiming and processing the frozen coal often exceeded processing capability and forced derating, loss of complete capacity, of some of the largest coal-burning power generating stations. This report covers the unusual difficulties experienced and the actions of the affected coal producers, transporters and users to alleviate future problems. The objective of this report is to define the nature and extent of frozen coal handling and burning problems at generating stations, mine sites and transfer points. Site surveys consisted of visits to 13 power plants or utility power companies representing approximately 60 coal-fired electrical generating stations, four mine sites and six transfer points. The specific problems at each site were investigated. Discussions with operating and management personnel emphasized corrective actions in effect or being considered. The final task was to present technically and economically feasible solutions and to present viable areas of reseach to alleviate problems with frozen coal. (ERA citation 05:021716)

FE-3274-1 PC **A08**/MF **A01**
Colorado School of Mines, Golden.
Experimental Design for Hydraulic Transport Research Facility. Final Technical Report.
R. R. Faddick. Dec 79, 169p
Contract ET-78-S-01-3274

A research program was to be defined for the operation of the newly constructed Hydraulic Transport Research Facility (HTRF). The program was to be designed to obtain engineering data for the design of efficient, economical, and reliable raw coal hydraulic haulage systems from the mine face to the wash plant. The research program was to be completed in the shortest feasible time and at the lowest operating cost. A five-year experimental design consisting of three phases was developed. After a two-month calibration period, Phase I (first year) tests all three pipeline diameters with both a washed and unwashed coal at varying slurry concentrations. Headlosses, deposition velocities, and exploratory work on flow transients constitute the test program. Phase II (second year) allows for implementation of the data logger for examination

of particle size distribution and flow transients. Phase III (next three years) comprises a definitive study on transients, particle size, and studies different coals and coal-refuse mixtures. New technology is also to be examined. It is recommended that a separate analytical team be formed from the current contractor team to coordinate the data generated by the HTRF and develop it for industry's use. (ERA citation 05:021699)

GA-A-15823 MF **A01**
General Atomic Co., San Diego, CA.
SolarOil Project, Phase I Preliminary Design Report.
G. Baccaglini, J. Bass, J. Neill, V. Nicolayeff, and F. Openshaw. Mar 80, 424p
Contract AC03-79CS30308
Microfiche copies only.

The preliminary design of the Solar Thermal Enhanced Oil Recovery (SolarOil) Plant is described in this document. This plant is designed to demonstrate that using solar thermal energy is technically feasible and economically viable in enhanced oil recovery (EOR). The SolarOil Plant uses the fixed mirror solar concentrator (FMSC) to heat high thermal capacity oil (MCS-2046) to 322 exp 0 C (611 exp 0 F). The hot fluid is pumped from a hot oil storage tank (20 min capacity) through a once-through steam generator which produces 4.8 MPa (700 psi) steam at 80% quality. The plant net output, averaged over 24 hr/day for 365 days/yr, is equivalent to that of a 2.4 MW (8.33 x 10 exp 6 Btu/hr) oil-fired steam generator having an 86% availability. The net plant efficiency is 57.3% at equinox noon, a 30%/yr average. The plant will be demonstrated at an oilfield site near Oildale, California. (ERA citation 05:022205)

GJBX-107(80) MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Walker Lake 1 exp 0 X 2 exp 0 NTMS Area California and Nevada: Data Report.
W. M. Fay, and P. L. Jones. Mar 80, 691p DPST-79-146-13
Contract EY-76-C-13-1664
Microfiche copies only.

This data report presents results of ground water and stream sediment reconnaissance in the National Topographic Map Series (NTMS) Walker Lake 1 exp 0 x 2 exp 0 quadrangle. Surface sediment samples were collected at 797 sites or at a nominal density of one site per 20 square kilometers (eight square miles). Ground water samples were collected at 77 sites or at a nominal density of one site per 220 square kilometers (87 square miles). Neutron activation analysis (NAA) results are given for uranium and 16 other elements in sediments, and for uranium and 8 other elements in ground water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps. Statistical summaries of data and a brief description of results are given. A generalized geologic map and a summary of the geology of the area are included. Data from ground water sites (on microfiche in pocket) include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, He, Mg, Mn, Na, and V). Data from sediment sites (also on microfiche in pocket) include (1) water chemistry measurements (pH, conductivity, and alkalinity), and (2) elemental analyses (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Sample site descriptors (stream characteristics, vegetation, etc.) are also tabulatedn Symbol plot maps, histograms, and cumulative frequency plots for most elements, U/Th and U/Hf ratios, and scintillometer readings are included on the microfiche. (ERA citation 05:023694)

GJBX-108(80) MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Reno 1 exp 0 X 2 exp 0 NTMS Area Nevada: Data Report.
C. B. Bennett. Mar 80, 562p DPST-79-146-15
Contract EY-76-C-13-1664
Microfiche copies only.

This data report presents results of ground water and stream sediment reconnaissance in the National Topographic Map Series (NTMS) Reno 1 exp 0 x 2 exp 0 quadrangle. Stream sediment samples were collected from small streams at 960 sites or at a nominal density of one site per 18 square kilometers (seven square miles). Neutron activation analysis (NAA) results are given for uranium and 16 other elements in sediments, and for uranium and 10 other elements in ground water and surface water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps. Statistical summaries of data and a brief description of results are given. A generalized geologic map and a summary of the geology of the area are included. Data from ground water sites (on microfiche in pocket) include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, He, Mg, Mn, Na, and V). Data from sediment sites (also on microfiche in pocket) include (1) water chemistry measurements (pH, conductivity, and alkalinity), and (2) important elemental analyses (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Sample site descriptors (stream characteristics, vegetation, etc.) are also tabulated. Symbol plot maps, histograms, and cumulative frequency plots for all the elements, U/Th and U/Hf ratios, and scintillometer readings are included on the microfiche. (ERA citation 05:023695)

GJBX-51(80) PC **A03**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Great Divide Basin Drilling Project Sweetwater County, Wyoming.
H. Vizcaino, and P. Ferrell. Apr 80, 35p
Contract EY-76-C-13-1664

A six-hole drilling program conducted in the southeastern part of the Great Divide Basin, south-central Wyoming, obtained subsurface geologic data to evaluate the uranium potential of the Battle Spring Formation (Tertiary). In the Great Basin the formation consists of fluvial and lacustrine siltstones, arkosic to feldspathic sandstones, and carbonaceous mudstones thought to contain intermediate-grade uranium (0.01 to 0.05% U sub 3 O sub 8). Low-grade uranium mineralization is widespread throughout the area and generally occurs in carbonaceous mudstones interbedded with intercalated beds of coarse-grained sandstone and lignite. The close relationship between the permeability of the surrounding rocks and the uranium content of the carbonaceous units suggests that the uranium was epigenetically emplaced. All six of the drill holes penetrated thin intervals of intermediate-grade uranium mineralization. (ERA citation 05:023675)

GJBX-54(80) PC **A03**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Thin, Dipping Ore Zone Logging Models. Log Studies.
C. J. Koizumi. Mar 80, 50p
Contract EY-76-C-13-1664

Thin, dipping mineralized zones are associated with a number of uranium deposits in various regions of the United States. In response to uncertainties about thin bed log interpretation, two thin, dipping ore zone logging models were constructed. Preliminary log studies with these models have established the following relation for gross gamma-ray logs of thin, dipping beds: GT = KA cos(theta), where G = radiometric equivalent uranium grade, T = true zone thickness, K = probe calibration constant. A = area under zone response curve, and theta = dip angle of thin zone. For horizontal (theta = 0) thin beds, this expression is identical to the well-known relation for gross gamma-ray logs of thick horizontal zones: GT = KA. In resource mapping, the cos (theta) factor is applicable if resources are to be projected onto a plane that is parallel to the plane of the dipping mineralized zone. If mapping is to be done on a plane that is perpendicular to the borehole, then the appropriate expression is GT = KA, regardless of the dip angle. A satisfactory method has not been found for determining T in thin beds, whether inclined to the borehole or not. (ERA citation 05:023676)

GJBX-57(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Rocky Mount/Manteo Topographic Map, North Carolina.
1980, 300p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Rocky Mount/Manteo National Topographic Map NI18-1 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium, and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:018419)

GJBX-62(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Lander National Topographic Map, Wyoming.
1979, 346p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Lander National Topographic Map NK12-6 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:018421)

GJBX-64(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Thermopolis National Topographic Map, Wyoming.
1979, 342p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Thermopolis National Topographic Map NK12-3 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data which each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units

and the corresponding airborne data, is included also. (ERA citation 05:018423)

GJBX-67(80) MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Beaumont NTMS Quadrangle, Texas.
29 Feb 80, 266p K/UR-134
Contract EY-76-C-13-1664
Microfiche copies only.

Results of a reconnaissance geochemical survey of the Beaumont Quadrangle, Texas are reported. Statistical data and areal distributions for uranium and uranium-related variables are presented for 707 groundwater and 619 stream sediment samples. Also included is a discussion on geologic factors considered significant in evaluating the potential for uranium mineralization. Groundwater data indicate that uranium concentrations above the 85th percentile occur primarily in a trend through the west central section of the quadrangle. Waters in this area are produced feom the Jasper aquifer, units that are defined as being part of the Burkeville confining system, and the Evangeline aquifer and have high values for arsenic, calcium, magnesium, and strontium. A smaller trend of high uranium values is located in the south central section of the quadrangle where waters are mainly produced from the Chicot aquifer. Stream sediment data indicate that uranium concentrations above the 85th percentile occur in sediments from the northern third and southeastern section of the quadrangle. In the northern trend of high uranium values, the sediments are derived from the Jackson Group and the Fleming and Catahoula Formations. Uranium appears to be associated with resistate and/or heavy minerals. Sediments that compose the southeastern trend are derived from the Beaumont Formation. (ERA citation 05:018426)

GJBX-72(80)(V.2) MF **A01**
Western Geophysical Co. of America, Houston, TX. Aero Service Div.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: Norton Bay Quadrangle (Alaska). Final Report.
Jan 80, 102p
Contract EY-76-C-13-1664
Microfiche copies only.

The histograms, multiparameter profiles, anomaly maps, and flight path map from the airborne gamma-ray spectrometer and magnetometer survey over the Norton Bay Quadrangle of Alaska are presented. (ERA citation 05:021831)

GJBX-77(80)(V.2) MF **A01**
Western Geophysical Co. of America, Houston, TX. Aero Service Div.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: McGrath Quadrangle (Alaska). Final Report.
Mar 80, 114p
Contract EY-76-C-13-1664
Microfiche copies only.

The histograms, multiparameter profiles, anomaly maps, and flight path map from the airborne gamma-ray spectrometer and magnetometer survey over the McGrath Quadrangle of Alaska are presented. (ERA citation 05:021838)

GJBX-81(80) PC **E03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Mesa NTMS 1 exp 0 X 2 exp 0 Quadrangle Area. Supplemental Data Report.
G. R. Koller. Jan 80, 61p DPST-80-146-15
Contract EY-76-C-13-1664

This data report presents supplemental analytical results for stream sediments and ground water. The samples were collected as part of the SRL-NURE reconnaissance in the National Topographic Map Series (NTMS) Mesa 1 exp 0 x 2 exp 0 quadrangle. Results are reported for 24 elements (Ag, As, Ba, Be, Ca, Co, Cr, Cu, K, Li, Mg, Mo, Nb, Ni, P, Pb, Se, Sn, Sr, Th, W, Y, Zn, and extractable U) in sediments and 31 elements (Ag, Al, As, B, Ba, Be, Ca, Ce, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Sc, Se, Si, Sr, Th, Ti, V, Y, Zn, and Zr) as well as pH, alkalinity, and conductivity in ground water. Field data and NAA data will be open-filed when they are available. Microfiche cards have been placed in a pocket on the last page of this report. These cards contain the following information: Cards marked Pg. 1, Pg. 2, and Pg. 3 contain histograms, cumulative frequency plots, and areal distribution plots for sediment samples. The card marked Plate 1 is a site-code map for sediment samples. (ERA citation 05:023682)

GJBX-82(80) PC **A02**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Survey of Lands Held for Uranium Exploration, Development, and Production in Fourteen Western States in the Six-Month Period Ending December 31, 1979.
Apr 80, 25p
Contract EY-76-C-13-1664

The statistics set forth for the period covered in this report are based on data gathered from records available to the public. The county records of mining claim locations, reports of state and federal land offices, and commercial reporting services furnish the data for this report. Accordingly, if any fee land has been acquired in a private transaction not entered into a public record or report, that land transaction will not be accounted for in this report. Manpower is not available to survey, acquire, and evaluate data from each available source in each reporting period. Therefore, in any given report, the figures quoted for one or more land categories in a given state may be identical to the figures shown in earlier reports even though some changes probably have occurred. Such changes will be shown on subsequent reports. The figures used for acreage controlled at the beginning of the calendar year are those published for that date in Statistical Data of the Uranium Industry GJO-100 (79) published and distributed by the Grand Junction Office of the Department of Energy. (ERA citation 05:021841)

GJBX-84(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Macon National Topographic Map, Georgia.
256p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Macon National Topographic Map NI17-10 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:021864)

GJBX-88(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Montgomery National Topographic Map, Alabama.
1980, 260p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Montgomery National Topographic Map NI16-11 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:021845)

GJBX-89(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Eastville/Norfolk Topographic Map, North Carolina/Virginia/Maryland.
Mar 80, 555p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Eastville/Norfolk National Topographic Maps, numbered NJ18-10 for Norfolk and NJ18-8,11 for Eastville, are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:021846)

GJBX-92(80) MF **A01**
Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Alabama, Georgia, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia. Volume 1. Instrumentation and Methods. Final Report.
Mar 80, 67p
Contract EY-76-C-13-1664
Microfiche copies only.

Instrumentation and methods described were used for a Department of Energy (DOE) sponsored, high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the contiguous Bluefield (Kentucky, Viriginia, West Virginia), Canton (Ohio, Pennsylvania, West Virginia), Charleston (Ohio, West Virginia), Charlottesville (Virginia, West Virginia), Chattanooga (North Carolina, Tennessee), Clarksburg, (Ohio, Pennsylvania, West Virginia), Corbin (Kentucky, Tennessee), Cumberland (Maryland, Pennsylvania, Virginia, West Virginia), Jenkins (Kentucky, Virginia, West Virginia), Roanoke (Virginia), and Rome (Alabama, Georgia), NTMS, 1:250,000 scale quadrangles. The objective of the work was to define areas showing surface indications of a generally higher uranium content where detailed exploration for uranium would most likely be successful. A Sikorsky S-58T aircraft equipped with a high-sensitivity gamma-ray spectrometer and ancillary geophysical and electronic equipment was employed for the quadrangle. The system was calibrated using the DOE calibration facilities at Grand Junction, Colorado, and Lake Mead, Arizona. Gamma-ray spectrometric data were processed to correct for variations in atmospheric, flight, and instrument conditions and were statistically evaluated to remove the effects of surface geologic variations. The resulting first-priority uranium anomalies (showing simultaneously valid eU, Eu/eTh, and eU/K anomalies) were interpreted to evaluate their origin and significance. Results of the interpretation in the form of a preferred-anomaly map, along with significance-factor profile maps, stacked profiles, histograms, and descriptions of the geology and known uranium occurrences are presented in the individual quadrangle volumes of this final report. (ERA citation 05:023684)

GJBX-93(80) MF **A01**
Geodata International, Inc., Dallas, TX.

Aerial Radiometric and Magnetic Survey: Cedar City Natioanl Topographic Map.
1979, 425p
Contract EY-76-C-13-1664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Cedar City National Topographic Map NJ12-7 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:021859)

GJO-108(79) PC **A13**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Industry Seminar.
1979, 280p CONF-7910129-
Contract EY-76-C-13-1664
Uranium industry seminar, Grand Junction, CO, USA, 16 Oct 1979.

There were 16 papers presented at the Seminar by speakers from the Department of Energy, US Geological Survey, and Bendix Field Engineering Corporation which is the on-site prime contractor for DOE's Grand Junction Office. Topics of the papers dealt with uranium policies, exploration, resources, supply, enrichment, and market conditions. There also were papers describing the National Uranium Resource Evaluation program and international activities. Separate abstracts were prepared for all the papers. (ERA citation 05:021875)

LA-UR-80-1012 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Overview of the National Uranium Resource Evaluation Hydrogeochemical and Stream Sediment Reconnaissance Program.
S. L. Bolivar. 1980, 40p CONF-800465-1
Contract W-7405-ENG-36
International geochemical exploration symposium, Hanover, F.R. Germany, 10 Apr 1980.

A Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) for uranium is currently being conducted throughout the conterminous United States and Alaska. The HSSR is part of the National Uranium Resource Evaluation sponsored by the US Department of Energy. This ambitious geochemical reconnaissance program is conducted by four Department of Energy laboratories: Los Alamos Scientific Laboratory, Lawrence Livermore Laboratory, Oak Ridge Gaseous Diffusion Plant, and Savannah River Laboratory. The program is based on an extensive review of world literature, reconnaissance work done in other countries, and pilot studies conducted by each laboratory. Sample-collection methods and sample density are determined to optimize the probability of detecting potential uranium mineralization. To achieve this aim, each laboratory has developed independent standardized field collection procedures that are designed for its section of the country. Field parameters such as pH, conductivity, climate, geography, and geology are recorded at each site. Most areas are sampled at densities of one sample site per 10 to 23 km exp 2 . The HSSR program has helped to improve existing hydrogeochemical reconnaissance exploration techniques. In addition to providing industry with data that may help to identify potential uranium districts and to extend known uranium provinces, the HSSR also provides multielement analytical data that can be used in water quality, soil, sediment, environmental, and base-metal exploration studies. (ERA citation 05:021863)

LA-UR-80-670 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Borehole Survey Instrumentation Development for Geothermal Applications.
B. R. Dennis. 1980, 17p CONF-800711-1
Contract W-7405-ENG-36
21. annual logging symposium, Lafayette, LA, USA, 8 Jul 1980.

The creation and subsequent study of hot dry rock geothermal reservoirs requires sophisticated tools and instruments that can function for relatively long periods of time in the hostile downhole environment. Detection of fracture dimensions and orientation of the geothermal reservoir is critical for the successful completion of the hot dry rock energy extraction system. The development of downhole instrumentation capable of characterizing the hydraulic-fracture systems must emphasize reliability of measuring devices and electro-mechanical components to function properly at borehole temperature exceeding 275 exp 0 C and pressures of 69 MPa. (ERA citation 05:023988)

LA-8321-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
NDA Technology for Uranium Resource Evaluation. Progress Report, January 1-June 30, 1979.
M. L. Evans. Apr 80, 35p
Contract W-7405-ENG-36

Calculational effort has focused on gamma-ray cross-section conversions, feasibility studies of an x-ray fluorescence (XRF) probe, and simulation of the prototype photoneutron logging tool. Experimental effort has concentrated on the design and fabrication of a field prototype photoneutron-based logging probe, on two types of borehole water monitors, and on a commercial pulse-shape discrimination unit to be used with the photoneutron logging probe. 37 figures, 4 tables. (ERA citation 05:023696)

LBL-6328 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Analysis of the Response of Geothermal Reservoirs under Injection and Production Procedures.
M. J. Lippmann, C. F. Tsang, and P. A. Witherspoon. Apr 77, 15p CONF-7704118-1
Contract W-7405-ENG-48
47. annual California regional meeting of the Society of Petroleum Engineers of AIME, Bakersfield, CA, USA, 13 Apr 1977.

The response of a liquid-dominated geothermal reservoir to injection and production from a single well is studied. Different injection-production schemes are analyzed to explore how to minimize temporary cooling around the injection well and to optimize thermal recovery. The pressure response is also calculated, and found to be affected significantly by temperature-dependent viscosity variations. This will have implications on well-test methods for geothermal reservoirs. Vertical consolidation of the geothermal system during fluid withdrawal is also discussed, showing the need to establish previous stress history before attempting to predict the reservoir deformation. The transport of heat and fluid through a porous reservoir is computed using a numerical model. The one-dimensional consolidation theory of Terzaghi has been coupled to the heat and fluid flow to calculate reservoir compaction. No attempt is made of model chemical reactions or precipitation that might occur when waters of a different temperature and salinity are injected into the reservoir. (ERA citation 05:022275)

N80-26663/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Studies on Questions of Design and Construction of Chain Scraper Conveyors.
H. Guder. Mar 80, 35p NASA-TM-75810
Contract NASW-3198
Transl. Into English of Glueckauf-Forschungshefte, (Germany, F. R.). V. 30, No. 3, Jun. 1969 p 103-116. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The basic behavior of mining crushed goods in chain scraper conveyors was examined using a special test stand. The characteristics resistance lines of the upper end-piece were determined for conveyor idle as a function of the determinative crushed good characteristics (granular structure, moisture content, type of goods) on the size of the conveyor load, on the conveyor construction and on the stopped time of the conveyor. Crushed goods with a narrow granular profile and sphere-like grains caused about 35% greater resistance than fine coal and raw coal with broad granular profile. For goods containing water more than 10% by weight, the solids friction retreated in favor of flow friction. The coefficient of resistance decreased considerably in the range of lower speeds and then increased with increasing conveyor speed. The conveyance of sandstone ore required about 280% greater specific drive than the conveyance of raw coal. Resistance coefficients for coal and raw coal showed no dependence on the design of the conveyor. Start-up of loaded conveyors after longer stop times was simulated and the specific break-loose force was determined.

ORO-4946-T1 MF **A01**
Tennessee Univ., Knoxville. Dept. of Civil Engineering.
Effects of Contour Coal Strip Mining on Stormwater Runoff and Quality.
D. E. Overton, and E. C. Crosby. Sep 79, 151p
Contract EY-76-S-05-4946
Microfiche copies only.

A mathematical model for simulating stormwater response and pollutant yield in strip mined watersheds was developed. This model consisted of a storm hydrograph simulator, a watershed pollutant load simulator and a site erosion simulator. The storm hydrograph simulator, TENN-I, has been optimized for the Tennessee Valley and can be used for both gauged and ungauged watersheds. The watershed soil load simulator, LOAD-I, was based upon development of a suspended load modulus that can be derived from storm hydrographs and sedigraphs. The site specific soil erosion model, ERODE-I, was based upon soil erosion mechanics and overland flow. Erosion, runoff, sediment delivery and total loads were simulated for storm events on both a real time basis and on a design storm basis. A regionalization scheme associated with the model permitted simulation of the effects of alternative development scenarios on stormwater and suspended load. Comparisons of the model are made with pollutant yields from watersheds which have undergone coal contour strip mining and urbanization. This model's ability to relate a watershed's stormwater runoff and pollutant load to measurable, quantifiable, and readily comparable quantities provides a powerful tool to evaluate the effects of land use change before the fact. (ERA citation 05:023518)

PB80-197353 PC **A03**/MF **A01**
National Science Foundation, Washington, DC. Engineering and Applied Science.
Mineral Resources Science and Technology, Project Summaries.
Feb 80, 33p NSF/RA-800006

The report is a compilation of 39 abstracts of applied research projects in the area of minerals processing and extractive technologies. One of the specific objectives of the Applies Research Program in the Engineering and Applied Science Directorate is to identify and support high risk, frequently interdisciplinary research aimed towards new processes and technologies for improving the efficiency of separation of minerals and extraction of metals from low grade ores and process wastes. In addition to the abstract the following information is given: project title, grant number, principal investigator, performing organization, grant duration, amount awarded, report number, and availability, if any. Some of the subjects covered in this report include research on zinc, copper, lead, cobalt, chromium ores, phosphatic slime, iron ore availability, metal recovery, magnetic separation, the mechanism of flocculation, the solution mining process, bacterial leaching, and flotation separation technology.

PB80-809205 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Mine Hoists and Hauling. 1973-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1973-Apr 80,
Robert Hippler. May 80, 180p

Sponsored in part by National Technical Information Service, Springfield, VA.

Mine hoists and hauling equipment, and practices, are covered in the cited abstracts. Equipment design, construction and use, and safety and emergency escape are included. Mine conveyer systems for people, equipment, coal, rock, and other materials are described. Mine practices and procedures, as they relate to hauling, lifting and conveying, are described. (Contains 200 citations)

PB80-813181 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Shale Mining, Processing, Uses, and Environmental Impacts. 1977-April, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1977-Apr 80,
Audrey S. Hundemann. Jul 80, 275p
Supersedes NTIS/PS-79/0513.

Worldwide research on exploration, mining, retorting, chemistry, thermal studies, and environmental impacts relating to oil shale development is discussed. A few abstracts deal with the production of synthetic fuels from shale oil and the economics of oil shale operations. (This updated bibliography contains 269 citations, 105 of which are new entries to the previous edition.)

SAND-80-0537 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Evaluation of European Empirical Methods for Subsidence in US Coal Fields.
D. E. Munson, and W. F. Eichfeld. Apr 80, 27p
Contract EY-76-C-04-0789

The purpose of this study was to assess the applicability of European subsidence methods for the emerging US longwall practice. Subsidence prediction in Europe has typically used either graphical methods (United Kingdom) or mathematical methods. The mathematical methods utilize either profile or influence functions. The graphical methods were developed in the United Kingdom (UK) by the National Coal Board (NCB) from subsidence data obtained from numerous mines. Although a large data base in the United States (US) is not available, the methods can be tested against some recent measurements of subsidence of an essentially flat deposit mined at a depth of 189 m in the Illinois Coal Basin. While the total predicted subsidence by the NCB method is approximately correct, the profile shapes are not well matched. On the other hand, the profile functions, which are fundamentally independent of orientation with respect to mining, give quite accurate representation of the measured profiles. Of the antisymmetric forms tried, a trigonometric form was slightly preferably because it predicted strains that were conservative, i.e., always somewhat greater than the measured values. These results suggest that much of the European subsidence experience is applicable to US practice. Consistent values of the parameters were found for profiles with similar initial conditions or similar orientations for two longwall panel results. It should be noted that the actual profiles were always somewhat more complex than the profile functions could adequately handle and that the development curves showed time-dependent effects as well. The magnitude of these time-dependent effects, while possibly small compared to the time-independent or instantaneous subsidence, are of importance and must eventually be incorporated into a proper analysis. (ERA citation 05:023538)

SAND-80-1134 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Directional Drilling in Tar Sands.
A. L. McFall. 1980, 13p CONF-800541-1
Contract EY-76-C-04-0789
Tar sands permeability enhancement workshop, Albuquerque, NM, USA, 8 May 1980.

Special in-situ reservoir accessing schemes have recently been given increased consideration as a means of improving unconventional fossil fuel recovery. Specifically, the efficiency of thermal recovery methods for tar sands or very heavy oils may be significantly improved through the use of directional drilling techniques that allow additional reservoir intersection. This paper summarizes near-horizontal drilling experiences and discusses those special problems that can arise in drilling tar sands. Finally, the status of two current Sandia projects is presented. Water jet drilling of long horizontal holes from a vertical wellbore and the design of a high accuracy inertial survey system for deviated holes are each discussed. (ERA citation 05:023620)

UCID-18596 PC **A09**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
LLL Industrial Support Program Test Results on Scale Control, Corrosion, H sub 2 S Abatement, and Injection at the Salton Sea Geothermal Field in FY 79.
R. Quong, and L. B. Owen. Mar 80, 196p
Contract W-7405-ENG-48

Six papers are included. Separate abstracts were prepared for each. (ERA citation 05:022270)

UCRL-Trans-11579 PC **A02**/MF **A01**
Intensification of the Process of Underground Gasification of Thick Coal Seams.
M. K. Revva, E. V. Kreining, D. K. Semeneko, E. G. Gershevich, and N. I. Shvetsova. Mar 80, 13p
Contract W-7405-ENG-48
A Problemiy podzemnoi gazifikatsii v kuzbasse; Kemerovo, No. 2 (1967), pp 106-115.

The effects of air flow rate and water influx on fuel gas composition and calorific value have been studied. Extensive experimental data are given. Air flow introduced through vertical boreholes resulted in stable operation with high flow rates. It is recommended that the diameter of vertical air inlet boreholes be increased to 200 mm and of gas outlet boreholes to 350 mm. (ERA citation 05:021618)

UCRL-Trans-11585 PC **A02**/MF **A01**
Experimental Studies of Some Regularities in the Underground Gasification of Inclined Coal Seams.
M. K. Revva, and E. V. Kreinin. Mar 80, 18p
Contract W-7405-ENG-48
A Problemy podzemnoi gazifikatsii v kuzbasse; Kemerovo, No. 2 (1967), pp 143-153.

Under natural conditions, the participation of underground water in the gasification process is considerably above the optimum level, and in coal seams 1 and 2 m thick is characterized by a specific water inflow of 1500 to 2500 kg/ton, and by a moisture content of 250 to 400 g/m exp 3 in the gas. The combustion heat of the gas in coal seams 1 and 2 m thick (especially in the first case) therefore is significantly below 1000 kcal/m exp 3 under such conditions. The decrease in the combustion heat of the gas with decreasing coal seam thickness is explained by the obvious increase in heat losses to the surrounding rock mass. An increase in the amount of underground water lowers the calorific value still further. The efficiency of gasification of coal seams 8.5, 2, and 1 m thick gradually decreases, being 65 to 70, 55 to 60, and 45 to 50%, respectively. Thus, as the thickness of the coal seam being gasified decreases, one must reduce the involvement of influent underground water in the gasification process. This can be accomplished by increasing the efficiency of the drying of the coal seam being gasified, or by intensifying the gasification process. During the underground gasification of coal seams of average thickness, a decrease was recorded in the combustion heat of the gas as the seams were gasified, from the start to the end of the gas generator's operation. For a long time, however, the quantitative value of this regularity was not recorded. After the decisive influence of the specific water inflow on the combustion heat of the gas was determined, a way of determining the dependence of the latter on the degree of gasification of the coal seam up-dip became clear. A small effect was found for the thinner seams. To avoid this loss in calorific value of the gas in these thinner seams, one must increase the rate of air delivery to the gas generator or use boreholes closer to the reaction surface. (ERA citation 05:021619)

UCRL-Trans-11586 PC **A03**/MF **A01**
Current Status of Underground Coal Gasification in the USSR.
P. V. Skafa, M. K. Revva, and V. N. Margushin. Mar 80, 26p
Contract W-7405-ENG-48
A Problemy podzemnoi gazifikatsii v kuzbasse; Kemerovo, No. 2 (1967), pp 183-197.

Russian experience in in-situ coal gasification of coal is reviewed briefly. Such gas is a low Btu gas and must be used in the immediate neighborhood of its production. However, it is a clean fuel, more valuable for some uses than coal itself and the protection and usage are more readily automated than coal mining and coal combustion. In power plants to generate electricity its usage is about 20 percent more efficient than the direct combustion of coal. Certain by-products (phenols, benzene, pyridines, ammonia, carboxylic acids, sulfur) also lower the cost of energy from such gas. The economics of in-situ gasification and direct use of coal for power generation are considered for several USSR coal basins, using large scale production estimates for both. (ERA citation 05:021620)

8J. Physical Oceanography

AD-A085 841/5 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Annual Variation in the Slope of the 14 C Isotherm along the Equator in the Pacific Ocean,
Gary Meyers. 22 Jun 78, 10p
Contract N00014-75-C-0152
Pub. in Jnl. of Physical Oceanography, v9 n5 p885-891 Sep 79. Prepared in cooperation with Hawaii Inst. of Geophysics, Honolulu. Rept. no. HIG-CONTRIB-948.

No abstract available.

AD-A085 850/6 PC **A05**/MF **A01**
Johns Hopkins Univ Baltimore MD Chesapeake Bay Inst
The Physical and Chemical Conditions of Chesapeake Bay; An Evaluation.
Special rept.,
J. R. Schubel. Jan 72, 77p Rept nos. SR-21, REF-72-1

An assessment of the physical and chemical conditions of the Chesapeake Bay estuarine system indicates: (1) that there are marked natural spatial and temporal variations of temperature, that man has in local areas, had a measurable effect on the temperature distribution, but that the present inputs of heated waters from power plants do not pose a threat to the Bay; (2) that there are large natural spatial and temporal variations of salinity, and that man has had almost no effect on the salinity distribution; (3) that man's activities have increased the frequency, duration, and extent of low oxygen zones in the upper reaches of a number of the tributaries; (4) that man's activities have resulted in large inputs of nutrients which have produced undesirable conditions in a number of the tributaries, but that the nutrient levels in the main body of the Bay are at an acceptable level; (5) that the Bay is being rapidly filled with sediments, and that the fine-grained sediments have a number of deleterious indirect effects on the ecology of the Bay; and (6) that there are large natural variations in the distributions of heavy metals, and suggests that levels have probably always been relatively high. (Author)

AD-A085 888/6 MF **A01**
Naval Oceanographic Office NSTL Station MS
Regional Geological/Geophysical Study of the Caribbean Sea (Navy Ocean Area NA-9). 1. Geophysical Maps of the Eastern Caribbean.
Final rept.,
James E. Matthews, and Troy L. Holcombe. Aug 76, 135p Rept no. NOO-RP-3
Includes envelope containing 10 maps.
Availability: Microfiche copies only.

A series of seven geophysical maps and three track control maps has been compiled for the eastern Caribbean Sea. These maps are based upon bathymetric, magnetic, and seismic data from all available sources, and are estimated to contain between 90 and 95 percent of all data in existence for the Venezuela Basin. A comparison of the seismic maps with the bathymetric map indicates that eastern Caribbean bathymetry is primarily controlled by structure. Sedimentary processes have tended to subdue the structural expression by partially filling depressions. The geomagnetic map

shows generally low relief resulting from the low magnetic latitude of the mapped area. High amplitude, short-wavelength anomalies are associated with igneous activity along the island chains and the Aves Ridge. Interpretations are limited, with emphasis placed on criteria used for compilation of the maps. References to the open literature have been cited in sufficient number to provide a general reading guide for further study. (Author)

AD-A085 916/5 MF **A01**
Scripps Institution of Oceanography La Jolla CA
Bathymetric Atlas of the North Pacific Ocean.
Final rept.
1978, 179p NOO-NO-PUB-1301-2-3(S)
Contract N62306-69-A-0072
Availability: Microfiche copies only.

This atlas is an interpretation of the sea-floor relief based upon the most accurate sounding data and contour charts available. The contour interval (200 fathoms) was selected to show the greatest detail over most of the area, consistent with the chart scale, quantity of available soundings, and navigational precision. However, these charts are not designed for and should not be used for navigation. In addition to the basic contour interval of 200 fathoms, the 100-fathom contour is shown as a dashed line, and contours at 20-fathom intervals are included in some regions having wide continental shelves and where data are sufficient to show this amount of detail. The contours represent depths uncorrected for variations in the velocity of sound in seawater from the assumed mean velocity of 4800 ft/sec (800 fm/sec).

AD-A085 947/0 PC **A05**/MF **A01**
Naval Oceanographic Office NSTL Station MS
Oceanographic Analysis Manual for On-Scene Prediction Systems,
Alan Fisher, Jr. May 78, 94p Rept no. NOO-RP-20

This report is intended to acquaint Naval personnel having minimal oceanographic training with techniques used to prepare an oceanographic analysis as an initial step in acoustic performance prediction. Oceanographic data are discussed with particular emphasis on the quality control of expendable bathythermograph (XBT) data. Oceanic features, such as water masses and boundaries, are reviewed to provide background information necessary for meaningful analysis. A sample analysis is made to assist the inexperienced analyst in methods used. Finally, the process of selecting data representative of each water mass for input into acoustic models is discussed. (Author)

AD-A085 948/8 PC **A05**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Bathymetric Atlas of the Northcentral Pacific Ocean,
H. W. Menard, and T. E. Chase. Mar 71, 83p
NOO-HO-PUB-1302-S
Contract N62306-69-A-0072

This atlas contains 74 bathymetric charts covering the Northcentral Pacific Ocean between 4 deg S and 62 deg N latitude and between 160 E and 140 W longitude. Sea floor relief is shown by means of 200 fathom contours based on a mean sound velocity of 4800 feet/second. Where sufficient data permits, the 100 and 200 fathom contours are shown. Principal sounding lines used in compilation and analysis of the sea floor relief are indicated by a subdued grey overprint on each chart. The scale of the charts is approximately 1:4,500,000. (Author)

AD-A085 989/2 MF **A01**
Naval Ocean Systems Center San Diego CA
Microcomputer-Assisted Flow-Through ASV System.
Final rept. Oct 76-Sep 79,
C. Clavell, Jr. Sep 79, 176p Rept no. NOSC/TR-532
Availability: Mirofiche copies only.

A microcomputer has been adapted for use with a flow-through anodic stripping voltammetry (ASV) instrument developed by the Naval Ocean Systems Center. The ASV instrument was originally developed to provide near-real-time analysis of trace metals in seawater. Four years' experience with this system in the coastal waters of Florida, Peru, and California showed that many ancillary instruments, such as pH meters, specific ion meters, and fluorometers, could be added to better define sharply varying ocean environments. To coordinate the operations of these instruments and to deal with the very large amount of raw data that would be generated, a Motorola 6800 microcomputer was added. Two major system software routines were developed for this application. The first controls ASV instrumentation, while the second is a monitor program that enables the system to function as a 'stand alone' microcomputer. Thus equipped, the system should greatly facilitate trace metal investigations in the field by increasing the amount and accuracy of the data obtained while decreasing routine manual operations. Moreover, with substitution of simulator for the wet-chemistry electromechanical unit, the system can serve as a tool for developing new software and hardware without requiring an investment in new, unproven equipment. The system can be expanded or modified within constraints of size, weight, and available memory. (Author)

PB80-201833 PC **A07**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
Arctic Sea ice. Part 1,
Marilyn J. Shartran. 1978, 134p GD-2-PT-1, NOAA-80052904
See also Part 2, PB80-201841.

The contributions in this issue are intended to provide information on data problems and data availability on arctic sea ice. It discusses problems associated with sea ice terminology. Descriptions of data acquisition and analysis centers are presented. A selected bibliography on arctic sea ice from 1965-77 and an author index are included.

PB80-201841 PC **A10**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
Arctic Sea ice. Part 2,
Marilyn J. Shartran. 1978, 201p GD-2-PT-2, NOAA-80052905
See also Part 1, PB80-201833.

This issue is the second part of Glaciological Data 2 and contains the second half of a selected bibliography on sea ice. An author index is also included.

8K. Seismology

DP-MS-80-1 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Savannah River Plant Seismograph Network.
C. W. Krapp. 1980, 15p CONF-800341-1
Contract EY-76-C-09-0001
South Carolina Academy of Science meeting, Charleston, SC, USA, 28 Mar 1980.

The network consists of three field seismometer sites (SRPN, SRPW, SRPD) and one central recording station. The seismic activity at each field site is detected by a seismometer, which is a movable coil that induces a series of electric impulses when vibrated. These electrical impulses are amplified and sent over telephone lines to a central recording site, where the signals are again amplified and then recorded by a heated stylus on heat-sensitive paper. The signals from sites SRPN and SRPW are fed directly to telephone lines, but the signal for SRPD is first transmitted by radio to the D-area powerhouse and then fed into a telephone line for transmission to the recording station. The signals from seismometer site SRPN are recorded at two different gains (high and medium) to permit different resolutions for earthquakes of different magnitudes. Performance of the system is described. (ERA citation 05:022440)

NUREG/CR-1503 PC **A08**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Geophysical Sciences.
Earthquake Focal Mechanisms in the Southeastern United States.
Technical rept.,
Stewart Allen Guinn. Jun 80, 164p
Contract NRC-04-77-210

Given a finite number of P wave first motions there exists a domain of valid foca mechanism solutions which satisfies the requirements set forth by the theory of the double couple without moment earthquake source. An analysis technique, adapted for computer application, which determines the domain of valid foca mechanism solutions in terms of the orthogonal pressure, tension, and null axis directions is developed. Focal mechanism solutions using the proposed analysis technique are determined for nine epicentral areas in the southeastern United States from published and new focal mechanism data. Focal mechanisms are proposed from the solutions and other geologic and geophysical data. In general, the focal mechanism solutions indicate that southeastern intraplate seismic activity does not appear to be the result of a single dominant stress direction. Many of the solutions support nearly vertical fault planes suggesting a low level compressional to tensional environment for the Southeast.

8L. Snow, Ice, and Permafrost

AD-A085 970/2 MF **A01**
Arctic Inst of North America Arlington VA
Concepts for Data Collection in the Arctic.
Final technical rept.,
Joseph A. Hatchwell. May 72, 78p
Contract N00014-70-A-0291-0003, ARPA Order-1783
Availability: Microfiche copies only.

This report identifies, describes, analyzes, and evaluates new concepts for collecting and processing data and information gathered above, on, and under sea ice and contiguous land areas of the Arctic Basin, including manned and unmanned systems of varying sizes with both short-term and long-term operations. (Author)

N80-26746/1 PC **A19**/MF **A01**
Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
Microwave Remote Sensing of Snowpacks.
Final Report.
W. H. Stiles, and F. T. Ulaby. Jun 80, 438p
NASA-CR-3263
Contract NAS5-23777

The interaction mechanisms responsible for the microwave backscattering and emission behavior of snow were investigated, and models were developed relating the backscattering coefficient (sigma) and apparent temperature (T) to the physical parameters of the snowpack. The microwave responses to snow wetness, snow water equivalent, snow surface roughness, and to diurnal variations were investigated. Snow wetness was shown to have an increasing effect with increasing frequency and angle of incidence for both active and passive cases. Increasing snow wetness was observed to decrease the magnitude sigma and increase T. Snow water equivalent was also observed to exhibit a significant influence sigma and T. Snow surface configuration (roughness) was observed to be significant only for wet snow surface conditions. Diurnal variations were as large as 15 dB for sigma at 35 GHz and 120 K for T at 37 GHz. Simple models for sigma and T of a snowpack scene were developed in terms of the most significant ground-truth parameters. The coefficients for these models were then evaluated; the fits to the sigma and T measurements were generally good. Finally, areas of needed additional observations were outlined and experiments were specified to further the understanding of the microwave-snowpack interaction mechanisms.

8M. Soil Mechanics

CONF-791090-7 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Regional Ecological Assessment Approach to Atmospheric Deposition: Effects on Soil Systems.
J. M. Klopatek, W. F. Harris, and R. J. Olson.
1979, 34p
Contract W-7405-ENG-26
Symposium on potential environmental and health effects of atmospheric sulfur deposition, Gatlinburg, TN, USA, 14 Oct 1979.

A regional ecological overview of the potential effects of acid precipitation on soils is presented.

Computer maps of soil pH, CEC, base saturation, and base content in the eastern United States are displayed using county level data. These maps are then overlain with a computer map of the hydrogen ion loading and resultant maps of acid sensitive and acid insensitive soils are presented. Of 1572 counties in the eastern US, only 117 are classified as being acid sensitive. A number of qualifications concerning the data and the implications for management are discussed. (ERA citation 05:024643)

PAT-APPL-6-139 077 PC **A02**/MF **A01**
Department of the Navy Washington DC
Soil Stabilization Materials and Methods.
Patent Application,
Kenneth L. Moore, and Gary W. Meyers. Filed 10 Apr 80, 9p AD-D007 322/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a method for stabilizing the soil wherein a liquid selected from the group consisting of a mixture of dimer diisocyanate and dimer diamine; and a mixture of dimer diisocyanate and a ketimine derivative of dimer diamine is applied to the soil and allowed to polymerize to form an elastomeric resin which bonds the soil particles together to form a composite structure. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A085 941/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Magnetron Electron Gun,
A. L. Gol'denberg, T. B. Pankratova, and M. I. Petelin. 23 May 80, 7p Rept no. FTD-ID(RS)T-1896-79
Trans. of Patent (USSR) 226 044 p1-3, 24 Nov 72, by Roger T. Crozier.

No abstract available.

AD-A086 078/3 PC **A02**/MF **A01**
Colorado State Univ Fort Collins Dept of Physics
Magnetoresistance Mobility Profiling of MESFET Channels.
Technical rept.,
J. R. Sites, and H. H. Wieder. Apr 80, 19p Rept no. SF27
Contract N00014-76-C-0976

Magnetoresistance provides a straightforward, non-destructive technique for determining the carrier mobility in the conducting channel of field effect transistors (FETs) over their full range of operation. The analysis is well suited to the typical FET geometry. The technique is illustrated here by a comparative study of GaAs depletion mode FET devices. (Author)

AD-A086 082/5 PC **A04**/MF **A01**
RCA Labs Princeton NJ
Development of 1.0- to 1.4-Micrometer Heterojunction LEDs.
Final technical rept. 17 Apr 78-16 Mar 79,
G. H. Olsen, Michael Ettenberg, C. J. Nuese, and Dan Botez. Apr 80, 64p PRRL-79-CR-18, RADC-TR-80-110
Contract F19628-78-C-0105

Both VPE and LPE InGaAsP/InP edge- and surface-emitting LEDs have been fabricated and tested under the present contract. Table 1 contains a summary of the results. Although the surface emitter provides greater total power, its half-width is considerably larger than that of the edge emitter. This increases pulse dispersion and reduces the amount of power that can be coupled into an optical fiber. The experimental conditions for the vapor-phase growth of InGaAsP and InP alloy are described. Detailed growth procedures are specified and plots of alloy composition, band-gap, lattice parameter and doping levels vs growth parameters are included. Modulation rates close to 100 MHz have been measured for 1.27-micron edge-emitting LEDs. Fall times on the order of 10 ns for (90 to 10% response) also have been obtained. Over fifty edge-emitting VPE 1.27-micron heterojunction LEDs have been fabricated from numerous wafers. External power efficiencies equal to or greater than 0.3% were routinely measured, with maximum efficiencies on the order of 0.7% (from one edge). Wafer-to-wafer reproducibility of power efficiencies has now been demonstrated with both the LPE and VPE growth techniques.

AD-A086 117/9 PC **A04**/MF **A01**
Raytheon Co Bedford MA
Investigation of Operation of Silicon CCD Delay Lines.
Interim rept. 11 Aug 78-30 Apr 79,
Arthur M. Cappon, Wolfgang M. Feist, Edwin G. Goodell, and Jay P. Sage. Feb 80, 57p RADC-TR-79-350
Contract F19628-78-C-0167

Theoretical analysis of input/output circuit operation for high frequency CCDs has been completed and a computer program for the analysis of various input/output schemes has been written. Initial analysis shows that potential equilibrium method, when operated at high speeds, will cause a residual charge to remain in 'zero' wells - essentially introducing an unintentional fat zero. This effort primarily reduces the available dynamic range; even at a .5 nanosecond equilibration time only a 1 to 2 percent nonlinearity is introduced. In 2.5 to 4 nanoseconds excess noise in this process is reduced to the thermal noise level. Chip design for the high speed CCD delay line is finished and masks are being fabricated. In addition to the 256 bit delay line with the Raytheon proposed ECMOS (Etched Channel MOS) I/O, the chip contains test structures of 64 stage delay lines, with differnet ratios of storage to transfer cell length; and both ECMOS and conventional MOS clock drivers.

CONF-791102-160 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Status of the Structural Design of Superconducting Magnets for the Large Coil Program.
W. H. Gray, and C. J. Long. 1979, 6p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Fusion reactor designs based on magnetic confinement will require the use of superconducting magnets to make them economically viable. For a tokamak fusion reactor, large magnetic field coils are required to produce a toroidal magnetic confinement volume. Although superconductors have been used for approximately 20 years, several requirements for their application in fusion reactors are beyond demonstrated technology in existing magnets. The Large Coil Program (LCP) is a research, development, and demonstration effort specifically for the advancement of the technologies involved in the production of large superconducting magnets. This paper presents a review of the status of the structural designs, analysis methods, and verification tests being performed by the participating LCP design teams in the US, Switzerland, Japan, and the Federal Republic of Germany. The significant structural mechanics concerns being investigated with the LCP are presented. (ERA citation 05:023356)

CONF-791102-164 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Progress on Large Superconducting Toroidal Field Coils.
P. N. Haubenreich, J. N. Luton, P. B. Thompson, and D. S. Beard. 1979, 4p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Large superconducting toroidal field coils of competing designs are being produced by six major industrial teams. In the US, teams headed by General Dynamics Convair, General Electric, and Westinghouse are under contract to design and fabricate one coil each to specifications established by the Large Coil Program. A facility for testing 6 coils in a toroidal array at fields to 8 to 12 tesla is under construction at Oak Ridge. Through an international agreement, EURATOM, Japan, and Switzerland will produce one coil each for testing with the US coils. Each test coil will have a 2.5 x 3.5 m D-shape winding bore and is designed to operate at a current of 10 to 18 kA at a peak field of 8T while subjected to pulsed fields of 0.14 T applied in 1.0 s. There are significant differences among the six coil designs: five use NbTi, one Nb sub 3 Sn; three are cooled by pool boiling helium, three by forced flow; five have welded or bolted stainless steel coil cases, one has aluminum plate structure. All are designed to be cryostable at 8T, with structural margin for extended operation. The three US coil teams are almost or completely finished with detailed design and are now procuring materials and setting up manufacturing equipment. The non-US teams are at various stages of verification testing and design. The GDC and GE coils are scheduled for delivery in the spring of 1981 and the others will be completed a year later. The 11-m diameter vessel at the test facility has been completed and major components of the test stand are being procured. Engineering and procurement to upgrade the helium liquifier-refrigerator system are under way. (ERA citation 05:025047)

JAERI-M-8140 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Safety Analysis of Superconducting Poloidal Magnets for a JAERI Experimental Fusion Reactor.
Mar 79, 185p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The design of superconducting poloidal magnets was restudied concerning safety. The magnetmotive force of the superconducting air core transformer was reduced from 60 MAT to 48 MAT by shortening the operation period of reactor, so that the maximum repeated tensile stress of structural material (304SS) caused by electromagnetic force was lowered to the level of 24 kg/mm exp 2 and stability margin of the superconductor was increased. The deterioration of thermal insulation in the vacuum jacket was studied, and safety valves were designed to cope with it. For repair, dissassembling the poloidal magnet was also studied in relation of the toroidal magnet. Analysis of general failure of the superconducting poloidal magnet was made by event tree and fault tree techniques. (Atomindex citation 11:501042)

JAERI-M-8204 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Eddy Current Loss Analysis for the Helium Vessel of the IEA-LCT Coil.
Y. Hosoda, and S. Shimamoto. Apr 79, 16p
In Japanese.
U.S. Sales Only.

The eddy current loss in the He vessel of the IEA-LCT coil was analyzed by finite element method, i.e. code FEM3D, and by electromagnetic equations. The result by FEM3D is 17.7 watts. and by electromagnetic equations 12.2 watts. Both analyses including some approximations, the eddy current loss in He vessel is 10 -- 20 watts. To reduce the loss, it is recommended to insert an insulation layer in the corner part of the vessel. (Atomindex citation 11:501031)

K/CSD/INF-79/27 PC **A02**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Numerical Methods for the Analysis of Laser Annealing of Doped Semiconductor Wafers.
J. R. Kirkpatrick, G. E. Giles, Jr., and R. F. Wood. 1980, 11p CONF-800712-1
Contract W-7405-ENG-26
15. AIAA thermophysics conference, Snowmass, CO, USA, 14 Jul 1980.

Certain classes of semiconductor devices can be manufactured by ion implantation of the dopant. Crystal damage resulting from the ion implantation can be annealed by melting the surface layer using a short, high-intensity laser pulse. The dopant atoms are redistributed during melting and resolidification. Analysis of this process requires studying two separate problems, each with its own difficulties. Heat transfer calculations with spatially and temporally varying internal heat sources and change of phase give the depth of melting, duration of the melted layer, and resolidification velocity. Dopant transport calculations give the diffusion of the dopant in the liquid and include segregation at the phase boundary. (ERA citation 05:024368)

N80-26602/6 PC **A02**/MF **A01**
Mississippi State Univ., Mississippi State. Microelectronics Research Lab.

A Study of Trends and Techniques for Space Base Electronics.
Quarterly Progress Report, 10 Mar. - 10 Jun. 1978.
J. D. Trotter, T. E. Wade, J. D. Gassaway, and Q. Mahmood. Jun 78, 24p NASA-CR-163293
Contracts NAS8-26749, MSU-EE-OUAR-3-78

A sputtering system was developed to deposit aluminum and aluminum alloys by the dc sputtering technique. This system is designed for a high level of cleanliness and for monitoring the deposition parameters during film preparation. This system is now ready for studying the deposition and annealing parameters upon double-level metal preparation. A technique recently applied for semiconductor analysis, the finite element method, was studied for use in the computer modeling of two dimensional MOS transistor structures. It was concluded that the method has not been sufficiently well developed for confident use at this time. An algorithm was developed for confident use at this time. An algorithm was developed for implementing a computer study which is based upon the finite difference method. The program which was developed was modified and used to calculate redistribution data for boron and phosphorous which had been predeposited by ion implantation with range and straggle conditions. Data were generated for 111 oriented SOS films with redistribution in N2, dry O2 and steam ambients.

N80-26616/6 PC **A09**/MF **A01**
Siemens A.G., Erlangen (Germany, F. R.). Forschungslab.
Supplementary Investigations of Fundamental Research Program Plasma Techniques.
Final Report.
W. Hertz, J. Mentel, H. Motschmann, and W. Tiemann. Dec 79, 192p BMFT-FB-T-79-43
Test in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The flow of SF6 in a double nozzle circuit breaker model with and without arc is investigated through the use of holographic systems. The gas flow interferograms are evaluated and a program is developed to calculate the gas density and velocity for adiabatic flow. The ac discharges in SF6 gas flows are investigated for a double nozzle circuit breaker.

N80-26617/4 PC **A08**/MF **A01**
AEG-Telefunken, Ulm (Germany, F. R.). Forschungsinst.
Semiconductor Crosspoints for Direct Replacement of Electromechanical Switches with High Voltage Requirements.
Final Report.
E. Baechle, R. Becker, H. Knapp, M. Kuisi, and F. Laemmel. Nov 79, 166p BMFT-FB-T-79-44
Test in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Specifications for solid state switches were developed based on studies of telephone exchange systems. It was found that a sufficiently high breakdown voltage coupled with a low resistance when the switch is closed are difficult to achieve. Hybrid integration with thick film technology led to solutions for crosspoint elements which were found to be only marginally cost effective. Alternative solutions are proposed.

N80-26618/2 PC **A05**/MF **A01**
Brown, Boveri und Cie, A.G., Heidelberg (Germany, F. R.). Zentrales Forschungslab.
Passivation of Silicon Power Devices by Thermal Oxidation.
Final Report.
A. Neidig, G. Wahl, K. Weimann, and G. Gilbers. Dec 79, 77p BMFT-FB-T-79-48
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

A method was developed for the passivation of high voltage silicon power devices which opens the way for low cost packaging of high voltage power devices. Thermal oxidation at temperatures between 600 C and 900 C is used followed by chemical vapor deposition of a barrier larger against alkaline impurities.

N80-26771/9 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Cost of Czochralski Wafers as a Function of Diameter.
M. H. Leipold, C. Radics, and A. Kachare. 15 Feb 80, 20p NASA-CR-163277, DOE/JPL-1012/37
Contracts NAS7-100, EX-76-A-29-1012

The impact of diameter in the range of 10 to 15 cm on the cost of wafers sliced from Czochralski ingots was analyzed. Increasing silicon waste and decreasing ingot cost with increasing ingot size were estimated along with projected costs. Results indicate a small but continuous decrease in sheet cost with increasing ingot size in this size range. Sheet costs including silicon are projected to be $50 to $60/sq m (1980 $) depending upon technique used.

ORNL/CSD-54 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Guide to Making Time-Lapse Graphics Using the Facilities of the National Magnetic Fusion Energy Computing Center.
J. K. Munro, Jr. May 80, 85p
Contract W-7405-ENG-26

The advent of large, fast computers has opened the way to modeling more complex physical processes and to handling very large quantities of experimental data. The amount of information that can be processed in a short period of time is so great that use of graphical displays assumes greater importance as a means of displaying this information. Information from dynamical processes can be displayed conveniently by use of animated graphics. This guide presents the basic techniques for generating black and white animated graphics, with consideration of aesthetic, mechanical, and computational problems. The guide is intended for use by someone who wants to make movies on the National Magnetic Fusion Energy Computing Center (NMFECC) CDC-7600. Problems encountered by a geographically remote user are given particular attention. Detailed information is given that will allow a remote user to do some file checking and diagnosis before giving graphics files to the system for processing into film in order to spot problems without having to wait for film to be delivered. Source listings of some useful software are given in appendices along with descriptions of how to use it. 3 figures, 5 tables. (ERA citation 05:023328)

PAT-APPL-6-147 992 PC **A02**/MF **A01**
Department of the Navy Washington DC
Low-Barrier-Height Epitaxial Ge-GaAs Mixer Diode.
Patent Application,
Aristos Christou, and John E. Davey. Filed 8 May 80, 10p AD-D007 313/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a high-frequency (9.3 GHz -94 GHz) gallium arsenide (GaAs) mixer diode having a low Schottky barrier height (approximately 0.4 eV) for operating at low noise figure levels at low local oscillator power levels (0.25 mW - 0.75 mW), includes a GaAs substrate, a thin (about 100A) epitaxial layer of germanium on the substrate, the epitaxial germanium being deposited at a rate of about 6 a per minute and at a substrate temperature in the range of 325 C-425 C, a layer of silicon dioxide (SiO2), the SiO2 being etched, and layers of platinum-titanium-molybdenum-gold on the growth of epitaxial germanium. Contact areas are then plated with a layer of gold. Ohmic contact to the GaAs substrate side includes a deposition of gold-germanium alloy. Each of the layers are individually deposited at certain temperatures and thicknesses in a vacuum. (Author)

PAT-APPL-6-153 240 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
JFET Oscillator.
Patent Application,
L. L. Kleinberg. Filed 27 May 80, 14p N80-26601/8, NASA-CASE-GSC-12555-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high frequency oscillator circuit is described. The circuit uses a low cost junction type field effect transistor (T sub 1) with a tuned circuit connected to its gate. The frequency of operation is determined by the tuned circuit and the capacitance reflected from the the source to the gate. The transistor is matched to the grequency of operation so that this frquency falls within the roll-off portion of the transistor's transconductance verses frequency curve, above the 3 db point in frequency. Phase shifting necessary to sustain oscillation occur to the operation of the transistor in the roll off portion of the curve and the addition of a phase shifting network (R sub 1 C) at the source. The resulting oscillator is small, stable, linear, and inexpensive.

PAT-APPL-6-160 034 PC **A02**/MF **A01**
Department of the Navy Washington DC
Heterojunction and Schottky Barrier EBS Targets.
Patent Application,
Herman H. Wieder. Filed 16 Jun 80, 24p AD-D007 300/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A metal semiconductor field effect transistor (MESFET) has a Schottky barrier gate formed by depositing an electron transparent electrode to allow its modulation by electric fields and electron beams. The electrode is coupled to an electric field source which is maintained constant or is varied for changing the current flow between the source electrode and drain electrode. An impinging modulating electron beam is directed through the transparent gate to further modulate the current flow between the source electrode and drain electrode and to effect an overall gain in the neighborhood of 1,000,000. The accelerating potential of the electron beams is of at least an order of magnitude less than conventional cathode ray tube potentials to reduce the possibility of damage to the MESFET material and, since a number of the MESFETS can be modulated by one or more electron beams, they have wide frequency selectivities broad bandwidths and high switching time capabilities.

PAT-APPL-6-160 697 PC **A02**/MF **A01**
Department of the Navy Washington DC
Dead-Faced Electrical Connector with Electromagnetic Vulnerability Protection.
Patent Application,
Alfred R. Erbe. Filed 18 Jun 80, 16p AD-D007 298/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrical connector assembly is disclosed in which the receptacle components are shielded by an electromagnetic radiation mask and in which no power is present at the front end of the receptacle when the receptacle is not connected to its mating electrical plug. Intermediate electrical contacts in the receptacle portion of the connector assembly completely close apertures in the mask when the receptacle is not mated and are moved from the mask apertures and into contact with the internal electrical conductors of the receptacle when engaged with the male electrical plug portion of the assembly. (Author)

PAT-APPL-6-161 183 PC **A02**/MF **A01**
Department of the Navy Washington DC
Integral-Shadow-Grid-Controlled Porosity Dispenser Cathode.
Patent Application,
Richard E. Thomas, George A. Haas, and Richard F. Greene. Filed 19 Jun 80, 17p AD-D007 297/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In a controlled-porosity dispenser cathode of the type which has a foil with a plurality of holes covering the emitting material so that emitting material is dispensed through the holes to the electron-emitting surface of the foil and electrons are actually emitted through the holes and a small area surrounding each hole, a non emitting shadow grid is laid down on the surface of the foil in such a configuration that it does not obstruct any of the emitting holes, has the same shape as the control grid, and is substantially in precise registration with the control grid. (Author)

PATENT-4 166 990
Not available NTIS
Department of Energy, Washington, DC.
Core/Coil Assembly for Use in Superconducting Magnets and Method for Assembling the Same.
Patent,
D. A. Kassner. Filed 12 Aug 77, patented 4 Sep 79, 8p PAT-APPL-824 192
Supersedes PAT-APPL-824 192-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A core/coil assembly is disclosed for use in a superconducting magnet of the focusing or bending type used in syncronous particle accelerators comprising a coil assembly contained within an axial bore of the stacked, washer type, carbon steel laminations which comprise the magnet core assembly, and forming an interference fit with said laminations at the operating temperature of said magnet. Also a method is presented for making such core/coil assemblies comprising the steps of cooling the coil assembly to cryogenic temperatures and drawing it rapidly upwards into the bore of said stacked laminations. (ERA citation 05:026258)

PB80-197395 PC **A03**/MF **A01**
Instituto Nacional de Tecnologia Industrial, Buenos Aires (Argentina).
Estudio Preliminar para la Fabricacion de Electrodos Grafiticos y Grafito (A Preliminary Study for the Production of Graphitic Electrodes),
Ana Maria Lopez Libertella, Santiago Bertolotto, and Alberto J. Zanetta. 1972, 34p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The study was prompted by the scarcity and high prices of petroleum. It reports on new technologies for the steel industry that will require a greater consumption of graphitic electrodes. The production or fabrication of non-graphitic electrodes and graphite for nuclear uses are included.

PB80-809346 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Electret Effect and Devices. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 84p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, and the physics of operation, of electrets using a variety of dielectric materials, is covered in the cited abstracts. Numerous applications, ranging from biomedical, acoustic, and laboratory studies, to transducers in rocket exhausts, are described. (Contains 68 citations)

PB80-809353 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Electret Effect and Devices. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 169p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, and the physics of operation, of electrets using a variety of dielectric materials, is covered in the cited abstracts. Numerous applications, ranging from biomedical, acoustic, and laboratory studies, to transducers in rocket exhausts, are described. (Contains 172 citations)

PB80-809403 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Treeing of Electrical Insulating Materials. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 45p
Sponsored in part by National Technical Information Service, Springfield, VA.

Treeing-type breakdown of electrical insulating materials is discussed in the cited works. Tree channels of electrical breakdown can be initiated by high-voltage stresses associated with partial discharges, or with liquid penetration into the dielectric insulation, for example, water treeing. Some dielectrics mentioned are polyethylene, epoxy resins, and ethylene-propylene. (Contains 42 citations)

SAND-79-2339 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Compressed Magnetic Flux Amplifier with Capacitive Load.
O. M. Stuetzer. Mar 80, 29p
Contract EY-76-C-04-0789

A first-order analysis is presented for a compressed magnetic flux (CMF) current amplifier working into a load with a capacitive component. Since the purpose of the investigation was to gain a general understanding of the arrangement, a number of approximations and limitations were accepted. The inductance of the transducer varies with time; the inductance/resistance/capacitance (LRC) circuit therefore is parametric and solutions are different for the stable regime (high C), the oscillation regime (low C), and the transition case. Solutions and performance depend strongly on circuit boundary conditions, i.e., energization of the circuit by either an injected current or by an applied capacitor charge. The behavior of current and energy amplification for the various cases are discussed in detail. A number of experiments with small CMF devices showed that the first-order theory presented predicts transducer performance well in the linear regime. (ERA citation 05:023357)

9B. Computers

AD-A085 827/4 PC **A04**/MF **A01**
General Electric Co Arlington VA Information Systems Programs
Measurement and Experimentation in Software Engineering.
Technical rept.,
Bill Curtis. 30 Apr 80, 62p Rept no. TR-80-388200-1
Contract N00014-79-C-0595

The contributions of measurement and experimentation to the state-of-the-art in software engineering are reviewed. The role of measurement in developing theoretical models is discussed, and concerns for reliability and validity are stressed. Current approaches to measuring software characteristics are presented as examples. In particular, software complexity metrics related to control flow, module interconnectedness, and Halstead's Software Science are critiqued. The use of experimental methods in evaluating cause effect relationships is also discussed. Example programs of experimental research which investigated conditional statements and control flow are reviewed. The conclusion argues that advances in software engineering will be related to improvements in the measurement and experimental evaluation of software techniques and practices. (Author)

AD-A085 872/0 PC **A04**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Advanced Feature Symbolization for Three-Dimensional Views.
Technical rept. Jun-Jul 79,
Brian J. Cullis. Apr 80, 53p Rept no. ETL-0223

This report documents initial research into the development of line-drawn symbols for point features in tactical terrain computer graphics. In this report, 21 significant point features for aircraft in tactical operations were selected for study. Symbols were designed for these 21 point features, with primary emphasis placed upon enhancing rapid user recognition, minimizing computer drawing time and computer storage requirements. Three candidate computer storage strategies, X-Y Absolute, Starburst and Run-Length-Starburst, were evaluated. The most efficient storage strategy for these symbols was the X-Y Absolute technique. The symbols were digitized, and software was developed to plot them in conjunction with existing three-dimensional terrain view software. (Author)

AD-A085 877/9 PC **A12**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Towards a Theory for Abstract Data Types.
Doctoral thesis,
Deepak Kapur. Jun 80, 255p Rept no. MIT/LCS/TR-237
Contract N00014-75-C-0661, Grant NSF-MCS74-21892

A rigorous framework for studying immutable data types having nondeterministic operations and operations exhibiting exceptional behavior is developed. The framework embodies the view of a data type taken in programming languages, and supports hierarchical and modular structure among data types. The central notion in this framework is the definition of a data type. An algebraic and behavioral approach for defining a data type is developed which focuses on the input-output behavior of a data type as observed through its operations. The definition of a data type abstracts from the representational structure of its values as well as from the multiple representations of the values for any representational structure. A hierarchical specification language for data types is proposed. A deductive system based on first order multisorted predicate calculus with identity is developed for abstract data types. A correctness criterion is proposed for an implementation coded in a programming language with respect to a specification. It is defined as a relation between the semantics of an implementation and the semantics of a specification. It does not require a correct implementation to have the maximum amount of nondeterminism specified by a specification. A methodology for proving correctness of an implementation is developed which embodies the correctness criterion.

AD-A085 880/3 PC **A07**/MF **A01**
Dayton Univ OH Research Inst
Accuracy of Digitized Photometric Data.
Technical rept. 1 Sep 76-30 Apr 79,
P. A. Graf, and H. T. Mohiman. Apr 80, 139p
AMRL-TR-79-76
Contract F33615-76-C-0525

This report documents the error analysis of the photometric data acquisition and analysis system used to process impact data collected on various AMRL impact facilities by the Biomechanical Protection Branch of the AMRL. Sources of error are identified in the data acquisition, digitizing, calibration, and digital processing phases of the total analysis system. The estimates of total error accrued in the coordinate solutions to the data from the Restraint System Dynamics (Nylon/Operational/Rigid) Comparison, the Upper Torso Retraction Study, and the -50 G sub X) Injury Protection Comparison tests are derived and presented. In the digital processing phase of the report, a frequency response function was developed for the 11-point quadratic least square smoothing technique used to compute the velocity and acceleration data. This frequency response was confirmed by applying the 11-point smoothing technique to time displacement data with known velocity and acceleration characteristics. (Author)

AD-A085 940/5 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center St Louis Air Force Station MO
Interactive Digital Terrain Data Displays.
Interim rept.,
Richard A. Berg. 25 Feb 80, 12p
Presented at the ACSM/ASP National Convention, 14 Mar 80. St. Louis, MO. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Defense Mapping Agency produces and maintains cartographic digital data bases in support of military flight simulation and aeronautical operations. These data bases include terrain elevations over various geographic areas, stored in grids of varying intervals. In order to have effective management of these digital data bases, it is necessary to display them quickly, in a format which permits human comprehension of the information. An Image Manipulation Station (IMS) has been developed for this purpose. It is a color display processor interfaced to a minicomputer, magnetic tape drive and disk storage device. The IMS reads digital terrain elevations from magnetic tape, manipulates the data with software and displays various images of the information. The programs generate an image with the general appearance of topographic relief. Shaded relief and anaglyph stereo

views can be added to further enhance the image. Color views are also generated for analysis purposes. Because the data base and the displayed image are congruent, an analyst can point to a position in the image and display the corresponding terrain elevation values on a CRT terminal. The IMS satisfies quality control requirements in a timely and inexpensive way. It allows the analyst to view the digital data quickly and positively to ensure that a data tape generated for distribution to field users is complete, free of discontinuities and covers the required geographic area. (Author)

AD-A085 956/1 PC **A03**/MF **A01**
Honeywell Systems and Research Center Minneapolis MN
Decentralized Control.
Final rept. 1 Jul 78-30 Dec 79,
E. D. Jensen. May 80, 34p Rept no. 80SRC36
Contract N00014-78-C-0511

A conceptual model of decentralized control for computer systems is presented. The model is founded on the principle that an activity at any particular level of abstraction is decentralized if there is no unique lowerlevel entity which enforces a consistent view of the activity state on the entities involved in that activity. Three factors are presented to determine how decentralized the control of an individual resource is: the number of controllers of a resource, the extent that each controller is involved in every control activity, and the parity of the controllers' authority. Two factors are presented to determine the decentralization of systemwide control: the number of controllers involved in each instance of multilateral management and the number of resources involved in each instance of multilateral management. Physical communication issues are discussed which effect the logical decentralization of control. Communication is considered to consist of the production and manifestation of signals. The observability of signals is the practical difference between the signal production and manifestation. Three factors of signal observability are presented: completeness, coherence, and latency. (Author)

AD-A085 969/4 PC **A15**/MF **A01**
Northrop Corp Palos Verdes Peninsula CA Electronics Div
Advanced Computer Technology - I (ACT I).
Final rept.
1 May 80, 334p Rept no. NORT-80-11
Contract F04704-75-C-0006

The primary specific goal of this program was to design, process and test four LSIC (Large Scale Integrated Circuit) parts which were representative of those needed for an advanced missile guidance computer. Two LSIC parts were to be appropriated to the CPU (Central Processor Unit) of the computer, and two were to be appropriate to the Memory Unit of the computer. The specific parts are a 4-bit slice GPU(General Processor Unit), a 256 word by 4-bit wide MPROM(Mask Programmable Read-Only Memory), a 256 word by 4-bit wide PSM (nonvolatile slow-write Permanent Store Memory for program store) and a 512 word by 1-bit wide TSM (nonvolatile fast-write Temporary Store Memory for scratchpad/data store). These four LSIC parts were designed, processed and tested on this program. This activity was preceded by a Basic Parts phase. It involved the design, process and evaluation of test vehicles to establish the necessary baseline of design rules and process sequences to meet the performance requirements on the LSIC parts. (Author)

AD-A085 994/2 MF **A01**
United Technologies Research Center East Hartford CT
Microprocessor Requirements for Implementing Modern Control Logic.
Final technical rept. 1 Mar 79-29 Feb 80,
Robert W. Guile, James R. Krodel, and Florence A. Farrar. Apr 80, 87p UTRC/R80-944590-1, AFOSR-TR-80-0443
Contract F49620-79-C-0078
Availability: Microfiche copies only.

A demonstration of the use of microprocessors for implementing linear quadratic Gaussian (LQG) control was conducted. The demonstration consisted of simulating linear system dynamics on an analog computer and implementing LQG control and estimation dynamics on a microprocessor. Two cases were studied -- a single input second order system and a four input fifth order system. The second order system was controlled using an Intel 8080 8-bit microprocessor and fifth order system was controlled using a 16-bit Digital Equipment Corp LSI 11/2 microprocessor. Key requirements addressed include microprocessor requirements for: (1) word size; (2) computational capability, including arithmetic and input/output operations; and (3) memory requirements. The requirements were compared against predicted requirements made using previously developed analytic techniques. The implementation involved developing general purpose algorithms required for implementing LQG control and estimation. These algorithms consisted of matrix/vector multiplication, vector addition and input/output service routines. The same algorithms were employed in both the second order and the fifth order demonstration.

AD-A086 023/9 PC **A02**/MF **A01**
Frank J Seiler Research Lab United States Air Force Academy CO
Alpha Particle-Induced Soft Errors. Part 2,
D. John Redman, Ronald M. Sega, and Richard Joseph. 1980, 7p
Pub. in Military Electronics/Countermeasures, p40, 42-44, 46, 48 Apr 80. See also Part 1, AD-A085 548.

No abstract available.

AD-A086 025/4 PC **A02**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
BANDIT User's Guide. Revision B.
Technical memo.,
Gordon C. Everstine. Dec 78, 6p Rept no. DTNSRDC-TM-184-77-03-REV-B
Revision of report dated May 77.

A users guide to the BANDIT computer program for the reduction of maximum bandwidth for NASTRAN is given.

AD-A086 065/0 PC **A07**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
Multiple Microprocessor System (MMS) Design Study. Volume I.
Final technical rept.
Mar 80, 150p RADC-TR-80-33-VOL-1
Contract F30602-78-C-0114
See also Volume 2, AD-A086 066.

This is a design for a Multiple Microprocessor System (MMS) to be built as part of the System Architecture Evaluation Facility (SAEF) being developed at RADC. The MMS was designed to be used in the modeling of a wide range of multiprocessor configurations for the purpose of evaluating their suitability to unique Air Force data processing requirements. The MMS accomplishes this goal by providing: (1) a set of processing elements built for emulation. (2) an extensive built-in performance monitor subsystem. (3) a time align control mechanism to keep the emulators aligned in time.

AD-A086 066/8 PC **A16**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
Multiple Microprocessor System (MMS) Design Study. Volume II.
Final technical rept.
Mar 80, 362p RADC-TR-80-33-VOL-2
Contract F30602-78-C-0114
See also Volume 4, AD-A086 067.

For abstract, see AD-A086 065.

AD-A086 067/6 PC **A05**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
Multiple Microprocessor System (MMS) Design Study. Volume IV.
Final technical rept.
Mar 80, 91p RADC-TR-80-33-VOL-4
Contract F30602-78-C-0114
See also Volume 1, AD-A086 065.

For abstract, see AD-A086 065.

AD-A086 086/6 MF **A01**
Maryland Univ College Park Computer Vision Lab
A Method for Finding Pairs of Anti-Parallel Straight Lines.
Technical rept. series,
Ann Scher, Michael Shneier, and Azriel Rosenfeld. Dec 79, 21p Rept no. TR-845
Contract DAAG53-76-C-0138, DARPA Order-3206
Availability: Microfiche copies only.

A method of pairing anti-parallel straight lines is presented and discussed. The pairing is based on the distance between the lines, the amount by which they overlap, and on whether or not other lines are interposed. Examples are shown of applying the method to high-resolution aerial photographs. Results indicate that cultural features such as roads and buildings can be extracted and that a significant reduction in the complexity of the image description can be obtained. (Author)

AD-A086 097/3 PC **A04**/MF **A01**
Maryland Univ College Park Dept of Computer Science
A Quadtree Medial Axis Transform.
Technical rept.,
Hanan Samet. Aug 79, 54p Rept no. TR-803
Contract DAAG53-76-C-0138, DARPA Order-3206

The skeleton and medial axis transform concepts used in traditional image processing representations are adapted to the quadtree representation. A new data structure termed the Quadtree Medial Axis Transform (QMAT) is defined. An algorithm is presented for the computation of the QMAT of a given quadtree by only examining each BLACK node's adjacent and abutting neighbors. Analysis of the algorithm reveals an average execution time proportional to the number of leaves in the quadtree. Some of the interesting properties of the QMAT vis a vis the quadtree are its compactness and a decreased shift sensitivity. (Author)

AD-A086 098/1 PC **A08**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Interfaces, Subroutines, and Programs for the Grinnell GMR-27 Display Processor on a PDP-11/45 with the UNIX Operating System.
Technical rept.,
Robert L. Kirby, Russ Smith, Philip A. Dondes, Sanjay Ranade, and Les Kitchen. Oct 79, 172p Rept no. TR-810
Contract DAAG53-76-C-0138, DARPA Order-3206

The specialized device interfaces for the University of Maryland Computer Vision Laboratory image acquisition and display equipment extend the capabilities of a PDP-11/45 hosting the UNIX operating system. The devices include the Grinnell GMR-27 color display processor, the other Computer Vision Laboratory display and scanning equipment, and the Digi-Data TM-11/TU-16 compatible tape drive. Subroutine packages give easy access to the interfaces from user programs, allowing full use of the special features. Programs using these subroutine packages and the well-designed UNIX operating system provide a flexible and powerful environment for image processing and program development.Short descriptions of these interfaces, subroutines, and programs are given for program writers and other users.

AD-A086 099/9 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Tree and Pyramid Structures for Coding Hexagonally Sampled Binary Images.
Technical rept.,
Peter J. Burt. Oct 79, 28p Rept no. TR-814
Contract DAAG53-76-C-0138, DARPA Order-3206

Tree and pyramid type data structures are described which may be used for storing and processing binary images that have been sampled on a hexagonal grid. These are analogous to the quadtrees and pyramids which have recently been developed for images sampled on a rectangular grid. Trees may be formed with 3, 4, 7, 9 ... branches per node. Of these the 'septtree', formed with 7 branches per node, promises to be particularly interesting since each node 'covers' a roughly hexagonal region of the image. (Author)

AD-A086 100/5 PC **A05**/MF **A01**
Maryland Univ College Park Computer Vision Lab

A General-Purpose Software Package for Array Relaxation.
Technical rept.,
Russell C. Smith. Dec 79, 86p Rept no. TR-839
Contract DAAG53-76-C-0138, DARPA Order-3206

Probabilistic relaxation as an image processing tool is becoming increasingly common. This report examines two versions of probabilistic relaxation, that initially proposed by Hummel, Zucker, and Rosenfeld, and the version recently introduced by Peleg. A software package is presented which allows either method to be applied to probabilistic images quickly and easily. The package makes full use of the power available under Bell Laboratories' UNIX operating system running on a PDP11/45 computer. Modular in form, it frees the researcher from the tedium of hand coding relaxation processes for each variation of relaxation tested. The application of relaxation to a threshold-like gray level modification scheme demonstrates the utility of the package. (Author)

AD-A086 101/3 PC **A02**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Feature Value Smoothing as an Aid in Texture Analysis.
Technical rept.,
Tsai-Hong Hong, Angela Y. Wu, and Azriel Rosenfeld. Dec 79, 23p Rept no. TR-844
Contract DAAG53-76-C-0138, DARPA Order-3206

When texture features are measured on small subimages, they are unreliable; but if we use large subimages, it is hard to find subimages that are uniformly textured. This paper describes a compromise approach: measure the features on small subimages, and smooth the resulting feature values in such a way that neighboring subimages that belong to differently textured regions are unlikely to influence one another. When this is done, classification performance improves substantially. Improvement is also obtained when the subimages are classified probabilistically and relaxation is used to adjust the class probabilities. The problem of choosing a window size that minimizes overall misclassification probability is also discussed. (Author)

AD-A086 102/1 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Shape Approximation Using Quadtrees.
Technical rept.,
Sanjay Ranade, Azriel Rosenfeld, and Hanan Samet. Dec 79, 26p Rept no. TR-847
Contract DAAG53-76-C-0138, DARPA Order-3206

The quadtree representation encodes a 2(n) by 2(n) binary images as a set of maximal blocks of 1's or 0's whose sizes and positions are powers of 2. With the aid of the quadtree, a hierarchy of approximations to the image can be defined. Several ways of doing this are described. The accuracy of these approximations is empirically evaluated by studying how fast estimates of the first few moments of the image, computed from the approximations, converge to the true values. Approaches to the problem of fast shape matching using these approximations are also discussed. (Author)

AD-A086 140/1 PC **A08**/MF **A01**
Doty Associates Inc Rockville MD
Handbook of Procedures for Estimating Computer System Sizing and Timing Parameters. Volume II. Addendum.
Final technical rept. 16 May 79-15 Feb 80,
William B. Humphrey, and John N. Postak. 15 Feb 80, 175p DAI-TR-235-VOL-2, ESD-TR-80-115-VOL-2
Contract F19628-79-C-0106
See also Volume 1, AD-A086 444.

In this volume, information about selected ESD C3 Embedded Computer Systems (ECS) is presented to illustrate the types of data that could be considered in the development of computer system analogies for sizing and timing studies. Also included are a number of graphic representations of computer system sizing and timing relationships that are based on algorithms developed by various computer scientists during the past several years. Although the relationships are presented in absolute values, users are cautioned not to consider any relationship by itself. Rather, they should be considered additional possible data points in the overall evaluation of a computer system's sizing and timing parameters. Also included are two examples of the application of the procedures discussed in Volume I: a proposed revision of the Data Item Description (DID) entitled, Computer Program Timing and Sizing Data (DI-S-30568); and a list of suggestions for future work to update and improve the estimating procedures. In addition, a reference listing, an annotated bibliography, and an index are provided.

AD-A086 190/6 PC **A04**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Blob Detection by Relaxation.
Technical rept.,
Alan Danker, and Azriel Rosenfeld. Jul 79, 57p Rept no. TR-795
Contract DAAG53-76-C-0138, DARPA Order-3206

A blob is a compact region lighter (or darker) than its background surrounded by a smoothly curved edge. Blobs can be detected using cooperating relaxation processes to enhance their interior and edge probabilities. A discussion of the processes working independently and together is given. The use of a pyramidal relaxation structure, the use of the closedness of contours as an additional information source, and the extension of cooperating relaxation processes to a time sequence of images are also discussed. (Author)

AD-A086 191/4 PC **A02**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Using Pyramids to Define Local Thresholds for Blob Detection.
Technical rept.,
Michael Shneier. Sep 79, 22p Rept no. TR-808
Contract DAAG53-76-C-0138, DARPA Order-3206

A method for detecting blobs in images is described. The method involves building a succession of lower resolution images and looking for spots in these images. A spot in a low-resolution image corresponds to a distinguished compact region in a known position in the original image. Further, it is possible to calculate thresholds in the low-resolution image, using very simple methods, and to apply those thresholds to the region of the original image corresponding to the spot. Examples are shown in which the technique is applied to several images. (Author)

AD-A086 245/8 PC **A03**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
Multiple Microprocessor System (MMS) Design Study. Volume III.
Final technical rept.
Mar 80, 36p RADC-TR-80-33-VOL-3
Contract F30602-78-C-0114
See also Volume 4, AD-A086 067.

This is a design for a Multiple Microprocessor System (MMS) to be built as part of the System Architecture Evaluation Facility (SAEF) being developed at RADC. The MMS was designed to be used in the modeling of a wide range of multiprocessor configurations for the purpose of evaluating their suitability to unique Air Force data processing requirements. (Author)

BNL-27665 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Overview of Image Reconstruction.
R. B. Marr. Apr 80, 59p CONF-7910159-1
Contract EY-76-C-02-0016
International symposium on ill-posed problems: theory and practice, Newark, DE, USA, 2 Oct 1979.

Image reconstruction (or computerized tomography, etc.) is any process whereby a function, f, on R/sup n/ is estimated from empirical data pertaining to its integrals, integral f(x) dx, for some collection of hyperplanes of dimension k < n. The paper begins with background information on how image reconstruction problems have arisen in practice, and describes some of the application areas of past or current interest; these include radioastronomy, optics, radiology and nuclear medicine, electron microscopy, acoustical imaging, geophysical tomography, nondestructive testing, and NMR zeugmatography. Then the various reconstruction algorithms are discussed in five classes: summation, or simple back-projection; convolution, or filtered back-projection; Fourier and other functional transforms; orthogonal function series expansion; and iterative methods. Certain more technical mathematical aspects of image reconstruction are considered from the standpoint of uniqueness, consistency, and stability of solution. The paper concludes by presenting certain open problems. 73 references. (ERA citation 05:025105)

DP-MS-79-105 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Snake Bites from Code Misuse and Overuse.
H. K. Clark. 1980, 11p CONF-800431-2
Contract EY-76-C-09-0001
Nuclear criticality safety topical meeting, El Paso, TX, USA, 8 Apr 1980.

Errors that can be made in using or misusing computer codes, and, specifically, in using computer codes for making nuclear criticality safety calculations are discussed. (ERA citation 05:022783)

INIS-mf-4739 MF **A01**
Instituto Politecnico Nacional, Mexico City. Escuela Superior de Fisica y Matematicas.
Regular Expressions Compiler and Some Applications.
Tesis (B. Sc.),
H. Saldana A. 1978, 126p
In Spanish.
U.S. Sales Only. Microfiche copies only.

We deal with high-level programming language of a Regular Expressions Compiler (REC). The first chapter is an introduction in which the history of the REC development and the problems related to its numerous applications are described. The syntactic and sematic rules as well as the language features are discussed just after the introduction. Concerning the applications as examples, one adaptation is given in order to solve numerical problems and another for the data manipulation. The last chapter is an exposition of ideas and techniques about the compiler construction. Examples of the adaptation to numerical problems show the applications to education, vector analysis, quantum mechanics, physics, mathematics and other sciences. The rudiments of an operating system for a minicomputer are the examples of the adaptation to symbolic data manipulaton. REC is a programming language that could be applied to solve problems in almost any human activity. Handling of computer graphics, control equipment, research on languages, microprocessors and general research are some of the fields in which this programming language can be applied and developed. (Atomindex citation 10:442207)

LA-UR-80-1195 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Improving Your Image with Computer Generated Graphics.
R. F. Hults. 1980, 4p CONF-800467-1
Contract W-7405-ENG-36
VIM 32 spring conference, San Francisco, CA, USA, 28 Apr 1980.

Ways of presenting data for visual communication are discussed. The use of computer-generated graphics is emphasized. (ERA citation 05:023387)

LBL-10207 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Limited-Angle 3-D Reconstructions Using Fourier Transform Iterations and Radon Transform Iterations.
K. C. Tam, and V. Perez-Mendez. Dec 79, 10p CONF-800453-2
Contract W-7405-ENG-48
International optical computing conference, Washington, DC, USA, 7 Apr 1980.

The principles of limited-angle reconstruction of space-limited objects using the concepts of allowed cone and missing cone in Fourier space are discussed. The distortion of a point source resulting from setting the Fourier components in the

missing cone to zero was calculated mathematically, and its bearing on the convergence of an iteration scheme involving Fourier transforms was analyzed in detail. It was found that the convergence rate is fairly insensitive to the position of the point source within the boundary of the object, apart from an edge effect that tends to enhance some parts of the boundary in reconstructing the object. Another iteration scheme involving Radon transforms was introduced and compared to the Fourier transform method in such areas as root mean square error, stability with respect to noise, and computer reconstruction time. 8 figures, 2 tables. (ERA citation 05:023388)

LBL-10615 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Computerized International Geothermal Information Systems.
S. L. Phillips, J. D. Lawrence, and S. R. Lepman.
Mar 80, 17p CONF-800704-1
Contract W-7405-ENG-48
NATO/CCMS meeting on pilot studies, Paris, France, 15 Jul 1980.

The computerized international geothermal energy information system is reviewed. The review covers establishment of the Italy - United States linked data centers by the NATO Committee on Challenges of Modern Society, through a bilateral agreement, and up to the present time. The result of the information exchange project is given as the bibliographic and numerical data available from the data centers. Recommendations for the exchange of computerized geothermal information at the international level are discussed. (ERA citation 05:023979)

LBL-10690 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
PLOT: A UNIX Program for Including Graphics in Documents.
P. Curtis. Apr 80, 60p
Contract W-7405-ENG-48

PLOT is a preprocessor to the document formatting program, NROFF, which makes it possible to include many kinds of plots, graphs, and drawings in a document directly; the necessity, in many cases, for having such illustrations done externally is thereby eliminated. One also avoids the messy procedure of making sure that NROFF leaves enough room for these externally done plots, pasting them down, and possibly unpasting them to move them elsewhere in the document. Instructions to PLOT are in a simple, easy-to-read graphics language designed specifically for this application. If desired, the user has complete control over the size, positioning, range, and content of the plot. If a great deal of specificity is not required, PLOT provides reasonable defaults for most parameters; this approach decreases the number of required input statements. Plots made use the full capabilities of the target terminal to a greater extent than NROFF has done before. This ability, however, limits it to use on certain hardcopy terminals. 25 figures, 2 tables. (ERA citation 05:023389)

N80-26620/8 PC **A04**/MF **A01**
Danish Research Center for Applied Electronics, Hoersholm.
Characterization of Random Access Memories: Strategies, Test Patterns and Parameters Involved in the Characterization of RAM Memories and an Evaluation of 16 K RAM's of Eight Manufactures.
E. Jensen, and B. Schneider. Nov 79, 55p ECR-93

Techniques for the testing and characterization of dynamic random access memories (RAM's) are described. The general background of RAM operations and related failure modes are discussed. This includes descriptions of typical RAM sensitivities due to supply voltage variations, supply voltage interactions, extreme temperatures, test patterns, operational modes, and timing conditions. An operating region can be defined for each device under test. In addition it is shown how the characterization will result in worst case test conditions for use in production testing. A characterization of eight manufactures of industry standard 16 k x 1 bit dynamic RAMS's is carried out and the sensitivities revealed are described and commented on.

N80-26641/4 PC **A06**/MF **A01**
Harris Corp., Melbourne, FL.
Optical Mass Memory Investigation.
Final Report.
2 May 80, 123p NASA-CR-161489
Contract NAS8-30564

The MASTER 1 optical mass storage system advanced working model (AWM) was designed to demonstrate recording and playback of imagery data and to enable quantitative data to be derived as to the statistical distribution of raw errors experienced through the system. The AWM consists of two subsystems, the recorder and storage and retrieval. The recorder subsystem utilizes key technologies such as an acoustic travelling wave lens to achieve recording of digital data on fiche at a rate of 30 Mbits/sec, whereas the storage and retrieval reproducer subsystem utilizes a less complex optical system that employs an acousto-optical beam deflector to achieve data readout at a 5 Mbits/sec rate. The system has the built in capability for detecting and collecting error statistics. The recorder and storage and retrieval subsystems operate independent of one another and are each constructed in modular form with each module performing independent functions. The operation of each module and its interface to other modules is controlled by one controller for both subsystems.

N80-27096/0 PC **A06**/MF **A01**
Amsterdam Univ. (Netherlands). Fysisch Geografisch en Bodemkundig Lab.
The Computer in Physical Geography de Computer in de Fysisch Geografie.
1979, 118p
Text in Dutch. Proc. Held in Amsterdam, 14 Apr. 1978.

No abstract available.

N80-27105/9 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
Computer Architecture and Software Tools for the Generation and Simulation of Microprograms.
M. Persson. 1979, 22p TRITA-NA-7916, TRITA-CS-7904
Sponsored in Part by Swedish Inst. For Appl. Math. And Swedish Board for Tech. Develop.

A summary is presented of five separate papers on microprogramming floating point arithmetic for the Varian-73 computer, a program and microprogram generator for the Varian-73, and a microprogrammed Fast Fourier Transform for the same machine.

N80-27106/7 PC **A05**/MF **A01**
Siemens A.G., Munich (Germany, F. R.). Unternehmensbereich Bauelemente.
Bipolar Microprocessor Circuits.
Final Report.
G. Weil. Nov 79, 82p BMFT-FB-T-79-49
Partly in German and English. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Partial results of a study to develop bipolar microprocessor devices as well as their associated cross assemblers and simulators are reported. Samples of two MSI peripheral devices were produced and work was started on three bipolar microprocessor devices.

N80-27110/9 PC **A02**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Computer Program Documentation: Cyber to UNIVAC Binary Conversion User's Guide.
E. W. Martin. May 80, 13p NASA-CR-160688, JSC-16692
Contract NAS9-15800

A user's guide for a computer program which will convert SINDA temperature history data from CDC (Cyber) binary format to UNIVAC 1100 binary format is presented. The various options available, the required input, the optional output, file assignments, and the restrictions of the program are discussed.

N80-27111/7 PC **A05**/MF **A01**
Washington Univ., St. Louis, MO. McDonnell Center for Space Sciences.
BIRP: Software for Interactive Search and Retrieval of Image Engineering Data.
R. E. Arvidson, L. K. Bolef, E. A. Guinness, and P. Norberg. Jul 80, 76p NASA-CR-3299, SL-4
Grant NSG-7087

Better Image Retrieval Programs (BIRP), a set of programs to interactively sort through and to display a database, such as engineering data for images acquired by spacecraft is described. An overview of the philosophy of BIRP design, the structure of BIRP data files, and examples that illustrate the capabilities of the software are provided.

N80-27112/5 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
CUBTRL: Automatic Cubature over a Triangle.
D. P. Laurie. Aug 79, 9p CSIR-TWISK-116

An algorithm which implements a method for automatic numerical integration over a triangle is described. An absolute error criterion is used when the mean value of the integrand lies between + or - 1, and a relative error criterion otherwise. Four program modules are supplied: subroutines CUBTRI and CUBRUL, function RNDERR, and a BLOCK DATA module. Separate single precision and double precision versions are supplied in order to take advantage of storage saving devices.

N80-27114/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
High Level Language for Measurement Complex Control Based on the Computer E-100I.
B. V. Zubkov. Jun 80, 34p NASA-TM-76243, PR-404
Contract NASW-3198
Transl. Into English of Russian Report PR-404, Moscow, 1978 p 1-32. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Academy of Sciences (Ussr), Moscow.

A high level language was designed to control the process of conducting an experiment using the computer "Elektrinika-1001". Program examples are given to control the measuring and actuating devices. The procedure of including these programs in the suggested high level language is described.

N80-27115/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Description and Texts for the Auxiliary Programs for Processing Video Information on the Yes Computer. Part 3: Test Program 2.
V. I. Borisenko, G.G., and Z. A. Stetsenko. Jun 80, 30p NASA-TM-76252, PR-426
Contract NASW-3198
Transl. Into English of " Opisaniyg I Teksty Vspomogatelnykh Program Obrabotki Videoinformatsii NA Yes Evm Chast 3, Programma Testa", Rept. Pr-426 Acad. Of Sci. USSR Inst. Of Space Res., Moscow 1978 p 1-25. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The functions were discribed and the operating instructions, the block diagram and the proposed versions are given for modifying the program in order to obtain the statistical characteristics of multi-channel video information. The program implements certain man-machine methods for investigating video information. It permits representation of the material and its statistical characteristics in a form which is convenient for the user.

N80-27129/9 PC **A02**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
Interpretation Techniques.
P. Klint. May 79, 21p MC-IW-110/79
Submitted for Publication.

The relative merits of implementing high level programming languages by means of interpretation or compilation are discussed. The properties and the applicability of interpretation techniques known as classical interpretation, direct threaded code, and indirect threaded code are described and compared.

N80-27130/7 PC **A04**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.

A Preliminary Report on Numerical Opertors in ALGOL 68: A Skeleton for a Modern Numerical Software Library.
P. W. Hemker, and D. T. Winter. May 79, 74p
MC-NW-66/79

A proposal for a set of numerical operators in ALGOL 68 is described. These operators enable ALGOL 68 users to program standard numerical computations in an easy, flexible way (i.e., in a way resembling the usual mathematical notation). The system of operators serves the same purpose as a numerical library (e.g., FORTRAN or ALGOL 60). Computations in numerical algebra, elementary numerical analysis (quadrature, root-finding) and initial value problems for ODE's are considered. In addition a flexible error message system is provided.

N80-27131/5 PC **A04**/MF **A01**
Research Inst. of National Defence, Stockholm (Sweden).
Activities Report of the Laboratory for Image Processing.
Annual Report, 1979.
Jan 80, 52p FOA-C-30179-E1

Application projects centered on image processing, image enhancement, visual perception, visual processing of pictorial information, and evaluation and optimization of information systems are described.

N80-27132/3 PC **A03**/MF **A01**
Montpellier Univ. (France). Dept. de Physique Mathematique.
A Package of Routines for Linear Inverse Problems.
M. Cuer, and R. Bayer. 1979, 36p PM-79/24
Contract CNEXO-78-5773

A package of FORTRAN routines using linear programming techniques in linear inverse problems such as gravimetry or geomagnetism is described. The package can be applied to inverse gravity or geomagnetic problems with a maximum data size on IBM 360/65 of the order: number of measurements up to 250, number of unknowns 600 or less.

N80-27150/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
An Automated Approach to the Design of Decision Tree Classifiers.
P. Argentiero, P. Chin, and P. Beaudet. Mar 80, 19p NASA-TM-80676

The classification of large dimensional data sets arising from the merging of remote sensing data with more traditional forms of ancillary data is considered. Decision tree classification, a popular approach to the problem, is characterized by the property that samples are subjected to a sequence of decision rules before they are assigned to a unique class. An automated technique for effective decision tree design which relies only on apriori statistics is presented. This procedure utilizes a set of two dimensional canonical transforms and Bayes table look-up decision rules. An optimal design at each node is derived based on the associated decision table. A procedure for computing the global probability of correct classfication is also provided. An example is given in which class statistics obtained from an actual LANDSAT scene are used as input to the program. The resulting decision tree design has an associated probability of correct classification of .76 compared to the theoretically optimum .79 probability of correct classification associated with a full dimensional Bayes classifier. Recommendations for future research are included.

ORNL/CSD-55 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Interactive VARPRO (INVAR), a Nonlinear Least Squares Program.
J. E. , Funderlic, R. E. Rall. May 80, 111p
Contract W-7405-ENG-26

An interactive program was developed for solving either linear or nonlinear least squares problems. Designed for use from a remote computer terminal, the program provides the user with on-line feedback and the opportunity to make changes or corrections during execution of the program. The program has been run on the DEC10 System at ORNL. The least squares method used is based on mathematical work of Golub and Pereyra. It takes special advantage of the structure of the model equation by treating the unknown parameters as linear or nonlinear depending on how they appear in the model. Initial estimates need to be provided only for the nonlinear parameters. The program is especially designed for use by people with a minimal knowledge of FORTRAN programming. However, a FORTRAN subroutine, which defines the model, must be supplied by the user. 7 figures, 2 tables. (ERA citation 05:023390)

PATENT-4 200 919 Not available NTIS
Department of the Navy Washington DC
Apparatus for Expanding the Memory of a Mini-Computer System.
Patent,
Robert E. Page, and Raymond B. Brackett. Filed 5 Dec 78, patented 29 Apr 80, 7p AD-D007 349/4, PAT-APPL-966 717
Supersedes PAT-APPL-966 717-78, AD-D006 596.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus for storing information to be used by a data processing system which employs a mini computer, where the mini computer is incapable of addressing more than a specified maximum number of discrete storage locations. The apparatus includes a plurality of memory modules for providing a number of information storage locations which exceeds the specified maximum number of the mini computer, each memory module including a plurality of memory sections, each memory section for providing a number of information storage locations which does not exceed the specified maximum number. The apparatus further includes a component for generating memory select signals, each of the memory select signals corresponding to a different one of the memory sections. An additional component, which is responsive to the memory select signals, is provided for coupling the data and address buses of the mini computer to a given one of the memory sections when the memory select signal corresponding to the given memory section has been generated, whereby the mini computer is capable of selectively accessing any one of the memory sections. (Author)

PATENT-4 208 729 Not available NTIS
Department of the Air Force Washington DC
Automatic Data Restore Apparatus for MNOS Temporary Store Memory.
Patent,
David W. Williams. Filed 8 Mar 79, patented 17 Jun 80, 4p AD-D007 375/9, PAT-APPL-6-018 697
Supersedes PAT-APPL-6-018 697, AD-D006 044.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An automatic data restore apparatus utilizing a pair of memory transistors in conjunction with a dual node detection circuit driving two-cross-coupled NOR gates to provide a temporary store memory unit. (Author)

PB80-197122 PC **A04**/MF **A01**
Instituto Nacional de Tecnologia Industrial, Buenos Aires (Argentina).
Manual de FORTRAN (Manual of FORTRAN).
Maria Victoria Ghisalberti de Lewis. Jul 77, 52p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The Fortran language is described based on the programmation of the language that is going to be used by a certain computer. Fortran (Formula Translation) is a language very similar to the mathematical language. Since it was invented by English speaking persons, the terms and punctuation used are English. Several examples of diagrams results are given and other tests to be carried out by the reader.

PB80-200280 PC **E02**/MF **A01**
Federal Compiler Testing Center, Falls Church, VA.
Texas Instruments, Inc., DX10 COBOL - Release 3.2 - Indexed I-O Module.
Technical rept.
1 Feb 80, 14p FCTC/TR-80/01

The report is prepared at the request of Texas Instruments to evaluate the results of running the Indexed I-O programs of the COBOL Compiler Validation System (CCVS74) against DX10 COBOL. These programs were run in conjunction with the testing of the DX10 COBOL compiler for its compliance to the Low-Intermediate level of Federal Standard COBOL. The Indexed I-O module is an extension to the Low-Intermediate level; therefore the results for this module are noted in a separate report. The technical report provides (1) a description of the evaluation environment and (2) a summary of Indexed I-O language elements together with any errors/deviations found as result of the evaluation.

PB80-813298 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
The Use of Computers in Solving Mathematical Problems. 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jun 80,
George W. Reimherr. Jul 80, 131p
Supersedes NTIS/PS-79/0798 and NTIS/PS-78/0782. See also 1971-1975, NTIS/PS-78/0781.

Reports are cited on the computer solution of algebraic and differential equations. The necessary software and hardware for implementation, as well as solutions to large sparse matrices, stiff differential equations, and statistical problems, are included. Some of the research is directly applicable to various physical sciences. (This updated bibliography contains 123 citations, 16 of which are new entries to the previous edition.)

SAND-80-0654 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
User/Programmer Guide for UCMD 99: Component Addition from Magnetic Tape Coordinate Data.
B. C. Whittet. Mar 80, 18p
Contract EY-76-C-04-0789

This document describes the FORTRAN computer program UCMD 99, which is used to read coordinate information from magnetic tape to create or append to an Applicon AGS/880 drawing file. 3 figures. (ERA citation 05:023392)

SAND-80-1031C MF **A01**
Sandia National Labs., Albuquerque, NM.
User Experience with Memory Management.
G. L. Lane. 1980, 3p CONF-800467-2
Contract EY-76-C-04-0789
VIM 32 spring conference, San Francisco, CA, USA, 28 Apr 1980.
Microfiche copies only.

Effects on computer users of the introduction of CMM at NOS1.3(485) at Sandia National Laboratories, Albuquerque are reported. Background information on the configuration, operating environment, users, and kinds of applications run on the different machines is given. Then some of the problems associated with CMM are described. Although they were overcome, they were more numerous than anticipated. (ERA citation 05:023393)

TU-Inf-05-28-78 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Applicability and Conception of the 1471 Serial Link Module.
F. Weidhase, M. Borkenhagen, K. Faulstich, and S. Hiekmann. 1978, 16p
In German.
U.S. Sales Only.

The 1471 link module developed at the Technical University Dresden is described. The main features are fast data transfer, reliability concerning perturbing effects, seperation of transmitter and receiver self-acting synchronization, completely insulated link modules, high common-mode rejection, self-checking, variable bit repetition frequency, and small demands concerning the transmission cable. Applicabilities are given and a comparison with known link modules is made. (Atomindex citation 11:503129)

TU-Inf-05-5-78 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
CAMAC-1240 Type Data Input Module.
F. Weidhase, and U. Meyer. 1978, 11p
In German.
U.S. Sales Only.

A CAMAC module including two 24 bit files for manual data input is described. (Atomindex citation 11:503128)

UCID-18617 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
SEPLOT: A Post-Processor Program for State Estimation Codes.
D. L. Lager, and S. G. Azevedo. 30 Mar 80, 84p
Contract W-7405-ENG-48

The computer program SEPLOT is described which reads data files produced by Kalman filter state estimation codes and produces time history plots of states, covariances, measurements, forcing functions, etc. Plots are also made of various performance measures of the filter such as the estimation error and innovations whiteness. The format of the data files and the command language for SEPLOT are given. SEPLOT executes on the CDC7600, and can be used in a batch or teletype interactive mode. 4 figures, 5 tables. (ERA citation 05:023394)

UCRL-83791 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Verification of Timing Constraints in Large Digital Systems.
T. M. McWilliams. Dec 79, 18p CONF-800622-2
Contract W-7405-ENG-48
17. design automation conference, Minneapolis, MN, USA, 23 Jun 1980.

A technique to verify automatically all the timing constraints in large digital systems, taking into account the component timing properties, wire delays, and any designer-specified timing constraints, is described. This system has been used to verify the timing constraints in the S-1 Mark IIA processor, which consists of 10,000 ECL chips, and is comparable in performance to the Cray I CPU. 5 figures. (ERA citation 05:022820)

UCRL-84095 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Comparing the Floating Point Systems, Inc. AP-190L to Representative Scientific Computers: Some Benchmark Results.
T. A. Brengle, and N. Maron. 27 Mar 80, 11p
CONF-800415-2
Contract W-7405-ENG-48
Annual FPS Users' conference, San Francisco, CA, USA, 28 Apr 1980.

Results are presented of comparative timing tests made by running a typical FORTRAN physics simulation code on the following machines: DEC PDP-10 with KI processor; DEC PDP-10, KI processor, and FPS AP-190L; CDC 7600; and CRAY-1. Factors such as DMA overhead, code size for the AP-190L, and the relative utilization of floating point functional units for the different machines are discussed. 1 table. (ERA citation 05:023396)

UCRL-84317 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mass Storage in Multiple Host Systems.
J. G. Fletcher. 24 Apr 80, 5p CONF-800472-1
Contract W-7405-ENG-48
IEEE symposium on MASS storage, Denver, CO, USA, Apr 1980.

Mass storage systems, like other computing systems, should adhere to certain well-known principles of good design, including modularity, generality, and efficiency. The implications of these in regard to hardware interfacing and network connectivity are reviewed. It is suggested that the situation is best treated in the context of a network operating system, and the characteristics of such a system are outlined. 1 figure. (ERA citation 05:023397)

9C. Electrical and Electronic Engineering

LA-8323-PR PC **A12**/MF **A01**
Los Alamos Scientific Lab., NM.
Dc Superconducting Power Transmission Line Project at LASL: US DOE Division of Electric Energy Systems. Progress Report No. 24, November 1, 1972-September 30, 1979. Final Report.
F. J. Edeskuty. Apr 80, 270p
Contract W-7405-ENG-36

Plans for a large-scale dc SPTL test have been indefinitely postponed because of budgetary restrictions. This final report on the Los Alamos Scientific Laboratory (LASL) dc Superconducting Power Transmission Line (SPTL) Development Project covers activities in electrical engineering, cryogenic engineering, and superconductor design for the period of November 1, 1972 through September 30, 1979. (ERA citation 05:024041)

N80-26785/9 PC **A03**/MF **A01**
Raytheon Co., Waltham, MA. Microwave and Power Tube Div.
Microwave Beamed Power Technology Improvement.
Final Report.
W. C. Brown. 15 May 80, 48p NASA-CR-163043, JPL-9950-373
Contract NAS7-100

The magnetron directional amplifier was tested for (1) phase shift and power output as a function of gain, anode current, and anode voltage, (2) background noise and harmonics in the output, (3) long life potential of the magnetron cathode, and (4) high operational efficiency. Examples of results were an adequate range of current and voltage over which 20 dB of amplification could be obtained, spectral noise density 155 dB below the carrier, 81.7% overall efficiency, and potential cathode life of 50 years in a design for solar power satellite use. A fabrication method was used to fabricate a 64 slot, 30 in square slotted waveguide array module from 0.020 in thick aluminum sheet. The test results on the array are discussed.

PB80-808975 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Extra High Voltage Power Transmission. 1974-April, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1974-Apr 79,
C. Gilbert Young. May 80, 196p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, construction and use of extra high voltage power transmission lines are discussed in the cited abstracts. Both underground and overhead lines are covered, as well as superconducting and resistive cryogenic lines. Health, safety and psychological aspects of the electric field, corona, ozone and acoustic effects of these lines are mentioned. New conductor, insulator, mounting, monitoring, control, lightning protection and other aspects of EHV power transmission are delineated. (Contains 194 citations)

9D. Information Theory

AD-A085 881/1 PC **A02**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Application of Biorthogonal Filter Functions to Pattern Recognition and Feature Extraction.
Research note,
Eugene A. Margerum. Mar 80, 24p Rept no. ETL-0222

A mathematical method is developed for generating a set of filter functions from a given set of signatures. The filter function set of functions is biorthogonal to the set of signature functions; therefore, any one filter function gives a perfect response to one signature, and a response to all other given signatures is completely suppressed. The method can be used to decompose superpositions of signatures as well as for improving separation of measured parameters for pattern recognition. It can also be used to suppress interferences from the background when it is included in the given set of signatures. A method of adding new filter functions to an existing set without complete recomputation (adaptive learning) is discussed. (Author)

AD-A086 138/5 PC **A03**/MF **A01**
Battelle Columbus Labs OH
Detectability of Objects in Speckle.
Technical rept.,
Adam Kozma. Oct 79, 27p DRSMI/RR-CR-80-1
Contract DAAG29-76-D-0100
Prepared in cooperation with Environmental Research Inst. of Michigan, Ann Arbor.

Theoretical work based on the statistical techniques of hypothesis testing applied to speckle noise in coherent images is extended. It is shown that this theory can be applied to determination of probabilities of detection for low and medium contrast objects immersed in speckle noise. (Author)

AD-A086 158/3 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Minimum Cross-Entropy Pattern Classification and Cluster Analysis.
Memorandum rept.,
John E. Shore, and Robert M. Gray. 10 Apr 80, 27p NRL-MR-4207, AD-E000 434

This paper considers the problem of classifying an input vector of measurements by a nearest-neighbor rule applied to a fixed set of vectors. The fixed vectors are sometimes called characteristic feature vectors, codewords, cluster centers, models, reproductions, etc. The nearest-neighbor rule considered uses a non-Euclidean, information-theoretic distortion measure that is not a metric, but that nevertheless leads to a classification method that is optimal in a well-defined sense and is also computationally attractive. Furthermore, the distortion measure results in a simple method of computing cluster centroids. Our approach is based on cross-entropy minimization (also called minimum discrimination information or minimum directed divergence), and can be viewed as a refinement of a general classification method due to Kullback. The refinement exploits special properties of cross-entropy that hold when the probability densities involved happen to be minimum cross-entropy densities. The approach is a generalization of a recently-developed speech coding technique.

AD-A086 230/0 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
A Technique for Generating Specialized Gray Codes,
V. E. Vickers, and J. Silverman. 29 May 79, 4p
Rept no. RADC/ETR-80-0017
Pub. in IEEE Transactions on Computers, vC-29 n4 p329-331 Apr 80.

No abstract available.

9E. Subsystems

AD-A085 830/8 PC **A05**/MF **A01**
RCA Labs Princeton NJ
Dual-Gate Mesfet Variable-Gain Constant-Output Power Amplifier.
Final rept. 18 Sep 78-17 Mar 80,
Mahesh Kumar. Apr 80, 77p Rept no. PRRL-80-CR-12
Contract N00173-78-C-0227
Includes Rept. no. PRRL-79-CR-46.

Phase I of this study proved the feasibility of the variable-gain, constant-output power amplifier from the chosen approach by demonstrating a breadboard model. During Phase II, the development of the final packaged amplifier with improved performance, the following tasks were completed: (1) a dual-gate FET amplifier was redesigned to obtain more gain (10 dB) over the band; (2) a video amplifier was designed and developed for higher gain (40 dB); and (3) circulators were eliminated to reduce the size of the amplifier. This amplifier was demonstrated to operate over a 3-GHz band (4.5 to 7.5 GHz) and to provide an output power of 3 + or - 2 dBm over its entire dynamic range of -45 to 0 dBm of input power. The linear ACG amplifier developed under this program has the following key features. (1) It preserves amplitude modulation of

the incoming signal. (2) It can perform normal AGC function under a multiple-pulse condition. This characteristic may prove to be very useful for handling multiple threats. (3) It is very versatile. It can provide separate ports to facilitate output power level adjustment and input signal detection and monitoring. (4) It has very fast response. The rise time and fall time of this amplifier are better than 15 ns which is limited by the measurement system.

AD-A085 846/4 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Applied Computation Theory Group
The Cube-Connected-Cycles: A Versatile Network for Parallel Computation.
Technical rept.,
Franco P. Preparata, and Jean Vuillemin. Nov 79, 31p Rept nos. ACT-20, UILU-ENG-80-2206
Contract N00014-79-C-0424, Grant NSF-MCS78-13642
Also available as rept. no R-874.

We introduce an interconnection pattern of processing elements, the cube-connected-cycles (CCC), which can be used as a general purpose parallel processor. Because its design complies with present technological constraints, the CCC can also be used in the layout of many specialized large scale integrated circuits (VLSI). By combining the principles of parallelism and pipelining, the CCC can emulate the cube-connected machine and the perfect shuffle with no significant degradation of performance but with a more compact structure. We describe in detail how to program the CCC for efficiently solving a large class of problems, which includes Fast-Fourier-Transform, sorting, permutations, and derived algorithms. (Author)

AD-A085 897/7 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Lab Operations
Microwave SQUID A/D Converters.
Interim technical rept.,
Arnold H. Silver, John P. Hurrell, Yeong-Du Song, and David C. Pridmore-Brown. 5 Jun 80, 36p TR-0080(5732)-1, SD-TR-80-34
Contract F04701-79-C-0080

This document reports progress on the demonstration of an analog-to-digital converter using Josephson junction SQUID circuits. The projected performance envisions an aperture time limit of 0.25 (x 10 times 10 to the minus 12) sec with the Pb alloy junction technology. The status of junction fabrication and circuit simulations are reported. (Author)

AD-A086 022/1 MF **A01**
Raytheon Co Quincy MA Industrial Components Operation
Manufacturing Methods and Technology Engineering (MM&TE) Program for the Establishment of Production Techniques for High Density Thick Film Circuits Used in Crystal Oscillators. Volume I.
Final rept. 6 Aug 76-Aug 79,
R. Michel Zilberstein. Apr 80, 210p DELET-TR-76-8119F
Contract DAAB07-76-C-8119
Availability: Microfiche copies only.

Production techniques have been established for a thick-film hybrid Microelectronic 17-22 MHz, temperature-compensated, voltage controlled quartz crystal oscillator. The program requirements, the plans for meeting those requirements, the technical approach pursued and the technical work accomplished are described. The program was subdivided into an Engineering Phase and a Production phase. The Engineering phase consisted of the following steps: the breadboard analysis of the TCVCXO electrical design; the configuration design of the TCVCXO module; the detailed layout design of the hybrid microcircuity used in the TCVCXO module; the detailed design of piece parts to be used to seal the hybrid microcircuits and to encapsulate the modules; the establishment of process flow plans to produce the modules; and the selection, characterization, and procurement of component parts and materials required for the production of the TCVCXO modules. The Production phase involved the development of tooling and manufacturing techniques needed to achieve the program requirements; and the delivery of completed modules in accordance with the program schedule. (Author)

AD-A086 074/2 PC **A04**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
A Hybrid Moment Method - GTD Technique for Analysis of Antennas Mounted on or Near Curved Surfaces.
Technical rept.,
Lee W. Henderson, and Gary A. Thiele. Apr 80, 68p Rept no. ESL-710816-7
Contract N00014-78-C-0049

A hybrid technique which will analyze thin wire scatterers in the presence of a large conducting body is presented. This technique is quite general and applicable to a large class of problems. Two specific cases were chosen to demonstrate the usefulness of this approach. The first example given is of two piecewise sinusoidal dipoles arbitrarily positioned near an infinite, perfectly conducting cylinder. The second example provides a method for analyzing antennas mounted on the cylinder, such as a monopole. This solution is obtained as a perturbation of image theory. (Author)

N80-26574/7 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Computer Program to Calculate Radiation Properties of Reflector Antennas.
P. K. Agrawal. May 78, 77p NASA-TM-78721

A computer program to calculate the radiation properties of the reflector antennas is presented. It can be used for paraboloidal, spherical, or ellipsoidal reflector surfaces and is easily modified to handle any surface that can be expressed analytically. The program is general enough to allow any arbitrary location and pointing angle for the feed antenna. The effect of blockage due to the feed horn is also included in the computations. The computer program is based upon the technique of tracing the rays from the feed antenna to the reflector to an aperture plane. The far field radiation properties are then calculated by performing a double integration over the field points in the aperture plane. To facilitate the computation of double intergral, the field points are first aligned along the equispaced straight lines in the aperture plane. The computation time is relatively insensitive to the absolute size of the aperture and even though no limits on the largest reflector size have been determined, the program was used for reflector diameters of 1000 wavelenghts.

N80-26595/2 PC **A02**/MF **A01**
Oulu Univ. (Finland). Dept. of Electrical Engineering.
A Microcomputer Based Measurement and Main Lobe Control System for an Array Antenna.
S. Lehto, J. Kekaelaeinen, and J. Kajava. 1978, 16p S-52-1978, ISBN-951-42-0578-2

A microcomputer based measurement and main lobe control system is presented. It was designed and constructed for a three stack, two bay array antenna for medium and long distance HF communication. The antenna system is used to gather and process ionospheric and propagation data (amplitude distribution of received signals, slow and fast fading, and the quality of the received signal). The main lobe of the array can also be automatically directed to the direction of the best propagation modes. The research antenna system is presently being used for propagation studies and tests in practical world-wide communications for assessing the effect of main lobe control on the short term and long term performance of HF antennas.

N80-26596/0 PC **A02**/MF **A01**
Oulu Univ. (Finland). Dept. of Electrical Engineering.
Modeling and Optimization of Transmitting Array Antennas in the Presence of Imperfect Ground.
S. Lehto, J. Kekaelaeinen, J. Kajava, and K. Kalliomaeki. 1978, 22p S-53-1978, ISBN-951-42-0579-0

An arbitrarily oriented antenna system consisting of an array of N antennas and a test antenna above the imperfect ground is described by (N+1) -port network. By using the field representation, the result shows how the ground parameters are incorporated into the model. The radiation pattern, directivity, and the power gain of the array are formulated in the transmitting case. The optimum excitations which maximize the directivity, and the power gain, are obtained as solutions of the corresponding eigenvalue equations.

N80-26603/4 PC **A04**/MF **A01**
RCA Solid State Technology Center, Somerville, NJ.
Characterization of Silicon-Gate CMOS/SOS Integrated Circuits Processed with Ion Implantation.
Final Report, 1 Jul. 1976 - 30 Jun. 1977.
D. S. Woo. Aug 77, 52p NASA-CR-150607, PRRL-77-CR-40
Contract NAS8-31986

Progress in developing the application of ion implantation techniques to silicon gate CMOS/SOS processing is described. All of the conventional doping techniques such as in situ doping of the epi-film and diffusion by means of doped oxides are replaced by ion implantation. Various devices and process parameters are characterized to generate an optimum process by the use of an existing SOS test array. As a result, excellent circuit performance is achieved. A general description of the all ion implantation process is presented.

N80-26614/1 PC **A04**/MF **A01**
AEG-Telefunken, Heilbronn (Germany, F. R.). Geschaeftsbereich Halbeiter.
Developments of High Complexity Linear Integrated Circuits.
Final Report.
B. Eichler. Oct 79, 60p BMFT-FB-T-79-36
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Requirements for an economical production of linear integrated bipolar circuits of high complexity are described. The results of this study were used to develop several complex integrated circuits using specific optimization techniques. Typical examples explain measurement techniques used with these circuits. Two concepts for PAL decoders with four and three integrated circuits are described.

N80-26615/8 PC **A04**/MF **A01**
AEG-Telefunken, Heilbronn (Germany, F. R.). Fachbereich Halbleiter.
Development of Technical Integrated Circuits.
Final Report.
I. Hagenloch. Nov 79, 51p BMFT-FB-T-79-41
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The results of integrated circuit development studies are reported. The following circuits are described: (1) two touch switches for mode and channel setting on radio and television receivers; (2) a phase control and a zero crossing switch to drive SCRs or Triacs; (3) a directional and a warning circuit for motor vehicles; (4) an automotive seat belt interlock system; (5) a timer for electronic watches; and (6) a light dimmer with touch control.

N80-26619/0 PC **A03**/MF **A01**
Siemens A.G., Munich (Germany, F. R.). Unternehmungsbereich Bauelemente.
Integrated Circuits for Remote Command and Data Transmission.
Final Report.
E. Schatter. Nov 79, 26p BMFT-FB-T-79-50
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

A universal system for command transmission was developed using as a starting point remote control techniques for television receivers. The system uses an infrared light carrier and features extremely high noise protection together with a wide action range. A digital transmitter and a receiver integrated circuit as well as a bipolar high-gain preamplifier were developed for this application.

N80-27113/3 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
An Algorithm for Computing High-Order Derivatives of Noisy Experimental Data Sequences.
H. Hatze. Nov 79, 15p CSIR-TWISK-123

An algorithm utilizing optimally regularized (filtered) Fourier series for estimating higher order derivatives of noisy data sequences is described. As the optimal filtering process takes place in the derivative domain, use being made of the statistical information contained in the periodogram of the data sequence, no numerical differentiation as such takes place, and all the problems known to be associated with such a procedure are avoided. The optimally filtered approximation to the function itself is obtained by the same technique. The algorithm is based on known results from time series and approximation theory and offers several advantages when compared with other techniques: the optimally filtered approximations of the function and all its required derivatives are obtained in a single run; compact analytical Fourier representations of the filtered function and the derivatives are available; all the desirable properties of Fourier approximations can be utilized; if fast Fourier transforms are used, the algorithm is computationally far more efficient than other techniques.

PAT-APPL-6-143 257 PC **A02**/MF **A01**
Department of the Navy Washington DC
Electrical Waveform Synthesizer.
Patent Application,
Joseph Edward Schwager, and Harry Earle Urban. Filed 24 Apr 80, 25p AD-D007 319/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrical waveform synthesizer comprising a shift register loadable by digital values provided by a programmable logic means is presented. The loaded values correspond to analog waveform amplitudes with the number of samples of the values being inversely proportional to the waveform frequency to decrease harmonic content of the waveform. The values are stepped along the shift register stages by a clock frequency signal applied to a clock input of the shift register. Outputted values can be recirculated back to the input of the register for providing a repetitious waveform or can be continuously inputted and outputted without recirculation. The bandpass of the filter is adjustable by the logic means according to the frequency and complexity of the waveform. The output waveform frequency can be shifted by shifting the clock frequency generated by a fine frequency vernier comprising a plurality of adder circuits connected in series, each adder circuit being loadable with digital values by the logic means with the output of the respective adder being recirculated to the respective adder input under the control of a precision oscillator.

PAT-APPL-6-147 413 PC **A02**/MF **A01**
Department of the Navy Washington DC
Switching Quadrature Detector.
Patent Application,
James P. Hansen. Filed 6 May 80, 9p AD-D007 314/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a quadrature detector wherein the I and Q quadraturely related signals are produced and processed in the same channel rather than parallel channels. A local oscillator feeds a 90 deg phase splitter which produces a pair of quadrature signals. These are alternately fed to a balanced modulator for mixing with an input R.F. signal. The sum and difference frequency signals are fed through a low-pass filter which passes only the I and Q difference-frequency signals. These are then separated to provide two output signals corresponding to quadrature components of the input R.F. signal. (Author)

PAT-APPL-6-153 987 PC **A02**/MF **A01**
Department of the Navy Washington DC
Magnetoplasmadynamic Switch.
Patent Application,
Peter J. Turchi. Filed 28 May 80, 18p AD-D007 308/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a magnetoplasmadynamic switch adapted to be coupled in parallel with an inductive energy storage circuit carrying current through an initially closed circuit interrupter. The switch includes an electrode spaced by a gap from an arcjet source which is triggered by a capacitor. The circuit interrupter is opened after the plasma jet is established between the source and the electrode, and the energy storage circuit current is conducted by the magnetoplasmadynamic switch until the dielectric strength of the circuit interrupter reaches a satisfactory level. Another switch is then closed providing a low impedance conduction path parallel to the arcjet source current. The decay of arc current disrupts the magnetoplsmadynamic force balance, cutting off the plasma jet. Plasma already in the gap, however, continues to leave at high speed reducing the density of conducting material below that needed for high conductivity, thereby opening the switch on the timescale of gap distance divided by plasma jet speed. The current from the inductive energy storage circuit is then diverted into a parallel circuit including an inductive load.

PAT-APPL-6-157 126 PC **A02**/MF **A01**
Department of the Navy Washington DC
Phase-Slipped Time Delay and Integration Scanning System.
Patent Application,
Edward H. Takken. Filed 6 Jun 80, 16p AD-D007 304/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a scanning system wherein a linear array of N detector elements having a uniform spacing of X cm between their centers is oriented parallel to the line scan dimension of a raster so that each element of the array optically scans the entire field of view at a rate of V cm. per second. The detector elements are sampled every t sub s seconds and each produces, when sampled, an output signal proportional to the integrated energy exposure thereof between samplings. The output signals of the various detector elements are delayed as a function of each element's position within the array and the line scan rate. The delayed imaging signals add to provide an improved signal to noise ratio. The variability of the waveform of the composite output signal for small-sized distant targets is minimized by introducing a progressively increasing phase shift in the relative timing of the sampling signals and initial contact of the image at successive detector elements. The composite output signal of the array then corresponds to an average over all possible relative timings of sampling signals and initial contact of the image at a detector element.

PATENT-4 197 517 Not available NTIS
Department of the Navy Washington DC
High Speed Frequency Tunable Microwave Filter.
Patent,
Carmine Vittoria. Filed 3 Nov 78, patented 8 Apr 80, 4p AD-D007 342/9, PAT-APPL-957 126
Supersedes PAT-APPL-957 126-78, AD-D005 728.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a magnetically tunable bandpass filter for use in the microwave regions, particularly for frequencies between 0.1-4 GHz. A magnetically tunable bandpass filter is a filter which will pass only certain frequencies form one conductor to a separate conductor depending upon the frequency band and the magnetic field applied across the filter. The tuning of the center frequency can be achieved at relatively fast electronic switch times. The center frequency is the frequency at which the most coupling exist due to the applied magnetic field. Two striplines are placed at 90 deg relative to one another with one end of one stripline overlapping one end of the other with the overlapped ends connected to ground. A disc of ferromagnetic material is placed between the two striplines. By applying a dc magnetic field and by changing the angle of the magnetic field within the disc plane, microwave signals can either be transmitted or not from one stripline to the other at a given frequency depending upon the applied magnetic field applied and the angle of application. (Author)

PATENT-4 198 632 Not available NTIS
Department of the Navy Washington DC
Transponder Reply Limiting by Means of Recognition of Fixed Interrogation Periods.
Patent,
Walton B. Bishop. Filed 10 Jun 71, patented 15 Apr 80, 15p AD-D007 344/5, PAT-APPL-151 973
Supersedes PAT-APPL-151 973-71.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

It is shown that the interrogation repetition period (IRP) of an interrogator can be recognized by a transponder and then used by it to both determine when the interrogator has elicited a predetermined number of replies called an adequate response and limit the interrogator to that number during each scan. This form of reply limiting by a transponder requires absolutely no change in the type of signals transmitted. Logic circuits that perform the required functions are provided. (Author)

PATENT-4 200 873 Not available NTIS
Department of the Navy Washington DC
Folded Tapered Coaxial Cavity-Backed Annular Slot Antenna.
Patent,
Elwin W. Seeley. Filed 5 Sep 78, patented 29 Apr 80, 5p AD-D007 348/6, PAT-APPL-939 734
Supersedes PAT-APPL-939 734-78, AD-D005 431.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A low profile transmitting antenna consisting of a circular slot in a coaxial cavity that is folded several times. The last inner fold of the coaxial cavity is loaded with the tuning coil. The tuning coil can in the alternative be connected in series with the transmitter leeds connected to the radiating slot. Concentric cylinders alternately attached to the top and bottom of the cavity are used to form ;the folded coaxial cavity that provides the equivalent of a tapered transmission line. Energy to be transmitted is fed across the circular slot of the antenna or in the alternative may be fed into the last inner fold in the center of the cavity. The antenna radiates energy out with the same radiation pattern as a vertical monopole antenna. (Author)

PATENT-4 201 987 Not available NTIS
Department of the Navy Washington DC
Method for Determining Antenna Near-Fields from Measurements on a Spherical Surface.
Patent,
Gus P. Tricoles, and L. Rope. Filed 3 Mar 78, patented 6 May 80, 10p AD-D007 352/8, PAT-APPL-883 430
Supersedes PAT-APPL-883 430-78, AD-D004 967.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for determining antenna near-fields from measurements on a spherical surface. Phase and intensity values are measured by scanning a probe antenna over a spherical surface. The method applies both to planar or conformal antennas. The spherical surface may be in the Fresnel or Fraunhofer regions. The field at the antenna is computed utilizing the complex conjugate of the measured field. As a result, the source antenna at the point at which the antenna radiating field is evaluated is inside the measurement surface. Far-field patterns can be computed from the near-fields reconstructed from the spherical hologram surface. (Author)

PATENT-4 207 495 Not available NTIS
Department of the Air Force Washington DC
Means for Improving the Collector Efficiency of an Emitting Sole Crossed Field Amplifier.
Patent,
Hunter L. McDowell. Filed 30 Aug 78, patented 10 Jun 80, 6p AD-D007 371/8, PAT-APPL-938 128
Supersedes PAT-APPL-938 128-78, AD-D005 371.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Crossed field amplifier collector efficiency is improved by decreasing the ratio of electron velocities to r.f. signal wave velocity at the output end of the amplifier slow wave circuit. In a preferred embodiment of the invention this is accomplished by tapering the sole emitting cathode so as to increase the cathode-slow wave circuit spacing in the output end of the interaction region prior to the collector. Alternatively, an increasing r.f. signal phase velocity taper can be used to provide the required decreased electron velocities to r.f. signal wave velocity ratio. (Author)

PATENT-4 207 547 Not available NTIS
Department of the Air Force Washington DC
Reflection Mode Notch Filter.
Patent,
Daniel C. Buck. Filed 1 Nov 78, patented 10 Jun 80, 5p AD-D007 374/2, PAT-APPL-956 705
Supersedes PAT-APPL-956 705-78, AD-D005 681.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A two stage transmission notch filter characteristic is achieved with one stage of microwave circuitry. Elimination of the second stage is accomplished by reflecting the microwave power back through a single stage device. Structurally, the adjacent ports of two 3 dB directional couplers are directly connected by delay lines of unequal delay times. The opposite adjacent ports of one coupler comprise the device input and output while the opposite adjacent ports of the other coupler are terminated in a manner that reflects microwave power back through the device. A phase shifter is inserted into one delay line for tuning and a non-reciprocal phase element is used to prevent reflected signals from emerging from the input port. (Author)

PB80-808512 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Active Filters. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 97p
Sponsored in part by National Technical Information Service, Springfield, VA.

The theory, design, construction and use of active filters are described in the cited abstracts. For example, by the use of resistive and capacitive elements, and one or more gain elements, circuit Q and center frequency can be essentially arbitrarily and independently set. A number of examples are given. (Contains 127 citations)

PB80-808538 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Adaptive Filters. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 160p
Sponsored in part by National Technical Information Service, Springfield, VA.

This general survey of adaptive filters includes transversal, Kalman, spatial, optical, microwave, electronic, acoustic, radar, video, sonar, ultrasonic, and other types. Some of the applications discussed are in radar clutter and moving target indicator (MTI) systems, signal enhancement, surface acoustic wave (SAW) devices, television systems and in underwater acoustics. Hardware, algorithms, and circuit design citations are included. (Contains 153 citations)

PB80-809155 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnetic Amplifiers. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 81p
Sponsored in part by National Technical Information Service, Springfield, VA.

Magnetic amplifiers, and their design and use, are discussed in the cited abstracts. Some applications covered are control circuits, power supplies, and motor speed controllers. Parametric, thermomagnetic, magnetostatic, paramagnetic, and ferromagnetic types of magnetic amplifiers are some of the varieties described. (Contains 58 citations)

PB80-809221 PC **N01**/MF **N01**
New England Research Application Center, Springfield, VA.
Parametric Amplifiers. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 113p
Sponsored in part by National Technical Information Service, Springfield, VA.

The theory, design, construction and operation of various types of electronic parametric amplifiers are treated in this retrospective survey of the field. Josephson, tunable optical, surface acoustic wave (SAW), as well as microwave and millimeter wave devices are included. Many applications in communications, radar, research and astronomy are covered. (Contains 113 citations)

PB80-809239 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Parametric Amplifiers. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 178p
Sponsored in part by National Technical Information Service, Springfield, VA.

The theory, design, construction and operation of various types of electronic parametric amplifiers are treated in this retrospective survey of the field. Josephson, tunable optical, surface acoustic wave (SAW) as well as microwave and millimeter wave devices are included. Many applications in communications, radar, research and astronomy are covered. (Contains 197 citations)

PB80-809247 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Parametric Amplifiers. 1977-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1977-Apr 80,
C. Gilbert Young. May 80, 164p
Sponsored in part by National Technical Information Service, Springfield, VA.

The theory, design, construction and operation of various types of electronic parametric amplifiers are treated in this retrospective survey of the field. Josephson, tunable optical, surface acoustic wave (SAW), as well as microwave and millimeter wave devices are included. Many applications in communications, radar, research and astronomy are covered. (Contains 172 citations)

UCID-18626 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Modeling of Antennas Near the Ground.
G. J. Burke, J. N. Brittingham, D. L. Lager, R. J. Lytle, and E. K. Miller. 13 May 80, 55p
Contract W-7405-ENG-48

An accurate and efficient numerical method based on the rigorous Sommerfeld theory is described for modeling antennas near an interface such as the ground. The Sommerfeld integrals are evaluated by numerical integration along contours in the complex plane and two-dimensional interpolation is used subsequently to obtain the many Sommerfeld integral values needed for the moment-method solution of an integral equation. These methods permit modeling an antenna within 10 exp -6 wavelengths of the ground for about two to four times the computation time for the same antenna in free space. Results showing currents and radiation patterns are included. (ERA citation 05:024538)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A086 196/3 PC **A04**/MF **A01**
Pacific Missile Test Center Point Mugu CA
Pacific Missile Test Center Energy Projects. Summary of Projects, Contributions, and Plans.
Technical publication,
Jay Rosenthal, and Craig Savant. Jan 80, 52p
Rept no. PMTC-TP-80-14

This report is a compilation of the projects undertaken at the Pacific Missile Test Center to conserve energy, develop and apply alternative energy sources, and develop, in the 1980s, basic capability (BACADE) projects for applying energy-saving technology to the needs of the Pacific Missile Test Center. (Author)

ALO-3977-5 PC **A06**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Physics and Astronomy.
Solar Pond Studies: Phase III. Fifth Semiannual Progress Report to the US Department of Energy.
H. C. Bryant, and M. K. Rothmeyer. 10 Jan 80, 125p
Contract EG-77-S-04-3977

The diffusion equation for salt gradient solar ponds has been modified to include the Soret effect (a thermal cross-effect due to the temperature gradient). The contribution of the Soret effect to the diffusion flux of salt is shown to be on the order of 4% in the winter and 28% in the summer for the UNM NaCl solar pond. The traditional stability criterion for solar ponds remains practically unchanged by the Soret effect. However, the contribution of non-constant properties (diffusion coefficient, thermal diffusivity and viscosity) - which have been neglected so far - seems to be significant. Saturated solar ponds are described by a system of differential equations which include the Soret effect, the formation and redissolving of crystals. The analytical solutions of this system are given for the steady-state and constant properties. A laboratory experiment using KNO sub 3 confirms the existence of a stable saturated gradient. Temperatures of up to 90 exp 0 C and temperature gradients of up to 2 exp 0 C/cm were used in the experiment without any sign of convective layers. A saturated gradient at steady state includes a super saturated region close to the surface which results in the fallout of crystals in that region. The diffusion flux of salt is thus balanced by a flux of crystals downwards and the net flux of salt is zero in a steady state. (ERA citation 05:023945)

ALO-4150-12 PC **A04**/MF **A01**
Owens-Illinois, Inc., Toledo, OH. Solar Energy Products Group.
Draining of the SUNPAK/Sup TM/ Evacuated Tubular Collector.
Y. K. Pei. May 80, 62p
Contract EG-77-C-04-4150

A program has been completed which demonstrates the capability of draining the present liquid series flow SUNPAK/sup TM/ evacuated tubular collector. The benefits which are derived include the avoidance of potential problems associated with liquid boil-out during system failure and the avoidance of collector freeze up. Additional benefits derived from a fully drained collector are the avoidance of significant heat losses during overnight periods, safe access to the collector for maintenance at any time and ability to dissipate excess heat through dry stagnation of the collector during shut down periods. A simple modification to the series flow SUNPAK/sup TM/ collector module arrangement was developed and demonstrated through the full scale testing of a two bank-six module arrangement. The necessary changes can be implemented at a minimum expenditure of time and cost. The extensive field service experience which has been accumulated with the liquid series flow SUNPAK/sup TM/ collector is directly applicable to the drainable configuration. The program included the investigation of an alternate approach to the series flow SUNPAK/sup TM/ solu-

tion. The intra module parallel flow concept was demonstrated through the proof of concept phase of effort. The solution investigated incorporated a batch flow rather than a continuous flow mode of the cooling fluid. The solution required an extensive design modification of the existing SUNPAK/ sup TM/ collector manifold. During the redesign effort, other desired mechanical features of the manifold were incorporated to improve the physical characteristics, to improve safety and reliability and to reduce the potential cost of future SUNPAK/sup TM/ collector arrays. (ERA citation 05:023949)

ALO-5348-T1 PC **A05**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Energy Resources Center.
Survey Mirrors and Lenses and Their Required Surface Accuracy. Semiannual Technical Progress Report, September 15, 1978-April 15, 1979.
May 79, 90p
Contract EM-78-C-04-5348

Since the beginning of widespread research and development for solar energy, a major concern has been the effect of optical and surface quality of collector materials on collector performance and the changes in these properties due to environmental conditions. In many instances, this type of data has not been compiled. When data is available on surface quality, mirror or lens optical characteristics, surface deformations due to stress and other errors, it is difficult to quantify the effect these have on a particular concentrator design performance. To further investigate these errors, Honeywell is performing a study of concentrator designs and mirror and lens surfaces. There are two taks within this program. The first task involves investigation and evaluation of concentrator performance. Within this task, Honeywell has conducted a survey of the literature, solar manufacturers and government information to obtain data on existing concentrator designs (i.e., V-troughs, parabolic mirror concentrators) and lens and mirror materials. Ten collector configurations have been selected to be mathematically modeled. These models will be incorporated into existing ray trace software and will be used to evaluate concentrator performance. Optical quality properties, structural deformations due to loading and stress, tracking errors and material property changes due to the environment will be included in this assessment of performance. The second task involves the expansion of an existing data base on mirror degradation due to environmental exposure and the collection of similar information on lenses. Status of the program is reported. (ERA citation 05:015423)

ANL/EES-TM-81 PC **A02**/MF **A01**
Argonne National Lab., IL.
Energy Performance Standards for New Buildings: Impact on the Use of Customer Storage.
J. Asbury, R. Giese, R. Mueller, and V. Rabl. 25 Feb 80, 21p
Contract W-31-109-ENG-38

This technical memo reviews the proposed Energy Performance Standards for new buildings and assesses their impact upon the commercial feasibility of off-peak energy storage in building heating and cooling applications. The technical data and assumptions uderlying the standards are examined with regard to their accuracy and relevance to off-peak energy storage. An estimate of the economic and scarce-fuel savings forgone under the Standards is also presented. It is recommended that temporary exceptions or exemptions for buildings with off-peak energy storage systems be granted until the Standards are modified to account for the economic and scarce-fuel benefits of off-peak energy storage. (ERA citation 05:024243)

BNL-27613 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Framework for Energy Policy and Technology Assessment in Developing Countries: A Case Study of Peru.
V. Mubayi, P. F. Palmedo, and A. B. Doernberg. Dec 79, 36p CONF-790175-1
Contract EY-76-C-02-0016
International conference on energy and the environment, Bangalore, India, 11 Jan 1979.

The potential of various energy sources and technology options in meeting national economic and social development goals in developing countries is assessed. The resource options that are of interest are the development of indigenous resources. In general, two categories of options can be considered: those which correspond to the accelerated implementation of existing elements of the energy system and those which correspond to the introduction of a new technology, such as solar electricity. The various resource and technology options that must be analyzed with respect to a number of criteria or payoff functions are: total demand and fuel mix; reduction of oil consumption; national social goals; total energy costs; and environmental quality. First, a view is constructed of the energy implications of current national economic development plans. A consistent description of the future energy system of the country, under the assumption of current trends and policies is constructed for certain reference years in the future. The values of the payoff functions selected are then calculated for that reference case. The major resource and technology options are identified and the rates at which they can be implemented are determined. Finally, the impact on the various payoff functions of the implementation of each option is calculated. The basic element of the framework is the Reference Energy System, discussed in Secton 3. The energy policy analysis for Peru is used as a reference case. 11 references, 10 figures, 2 tables. (ERA citation 05:024200)

BNL-27721 PC **A02**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Economic Assessment of Alternative Energy Policies.
P. J. Groncki, R. J. Goettle, IV, and E. A. Hudson. Apr 80, 20p CONF-800548-2
Contract EY-76-C-02-0016
Eastern Economic Association annual meeting, Montreal, Quebec, Canada, 8 May 1980.

Current US energy policy includes many programs directed toward the restructuring of the energy system so as to decrease US dependence on foreign supplies and to increase our reliance on plentiful and environmentally benign energy forms. However, recent events have led to renewed concern over the direction of current energy policy. This study describes three possible energy strategies and analyzes each in terms of its economic, environmental, and national security benefits and costs. Each strategy is represented by a specific policy. The first strategy is to initiate no additional programs or policies beyond those currently in effect or announced. The second is to direct policy toward reducing the growth in energy demand, i.e., energy conservation. The third is to promote increased supply through accelerated development of synthetic and unconventional fuels. The analysis focuses on the evaluation and comparison of these strategy alternatives with respect to their energy, economic, and environmental consequences. The analysis indicates that conservation can substantially reduce import dependence and slow the growth of energy demand, with only a small macroeconomic cost and with substantial environmental benefits; the synfuels policy reduces imports by a smaller amount, does not reduce the growth in energy demand, and involves substantial environmental costs and impacts on economic performance. However, these relationships could be different if the energy savings per unit cost for conservation turned out to be less than anticipated; therefore, both conservation and R, D, and D support for synfuels should be included in future energy policy. (ERA citation 05:024201)

BNL-50994 PC **A07**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Annual Abstracts of the National Center for Analysis of Energy Systems.
Dec 78, 145p
Contract EY-76-C-02-0016

The National Center for Analysis of Energy Systems at Brookhaven has been in operation since January 1976. This 1978 Annual Abstracts report illustrates the scope of activities of the Center involving the integrated analyses of technological, economic, environmental, and social aspects of energy at the regional, national, and international levels. The major ongoing activities of the Center include: analysis of energy-economic relationships; regional energy and environmental policy; comparative health effects of alternative energy systems; technology assessment and energy R and D priorities; development of energy-economic-environmental models and data bases; R and D strategies for the International Energy Agency; and energy technologies for developing countries. The objectives of the Center and major accomplishments of 1978 are described in the Annual Highlights of the National Center for Analysis of Energy Systems, BNL 50969, which also describes the energy data bases and analytical models used in the course of policy analyses. The multi-disciplinary approach used in the Center, and the close interaction with other analytical groups in universities and industry, provides a unique perspective on the energy situation. This is evidenced by the broad range of activities cited in this Annual Abstracts report. (ERA citation 05:020719)

BNL-51093 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Use of the Reference Energy System and EEMIS to Analyze Some Cause-Effect Relationships.
J. D'Acierno, and A. Hermelee. Nov 79, 23p
Contract EY-76-C-02-0016

The Energy Emergency Management Information System (EEMIS) and the Reference Energy System (RES) form an ideal framework for analyzing cause-effect relationships in the petroleum and natural gas energy systems. This report presents four case studies that demonstrate the applications of EEMIS and the RES for analyzing (1) the relationships between weather and the demand for energy in regions of the US, (2) the effect of a refinery outage on oil product distribution, (3) the impact of transportation outages on the flow and supply of petroleum, and (4) the relationship between income and energy usage. (ERA citation 05:020734)

BNL-51095 PC **A02**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Time-Stepped Energy System Optimization Model (TESOM): Overview and Special Features.
A. S. Kydes, and J. Rabinowitz. Dec 79, 21p
Contract EY-76-C-02-0016

This paper provides an overview of TESOM, a time-dependent energy integrating model used at Brookhaven National Laboratory for energy systems analysis. Special control theoretic features which act to smooth the intertemporal transitions between time periods are highlighted. These features include a new-market penetration algorithm, an explicit representation of the technological and cost behavior of inherited (vintaged) stock, and the incorporation of risk factors in resource pricing. (ERA citation 05:020720)

BNL-51135 PC **A04**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Regional Issue Identification and Assessment Program (RIIA). Environmental Impacts and Issues of the EIA MID-MID Scenario: Federal Region I (New England).
J. Brainard, and J. S. Munson. 15 Apr 79, 64p
Contract EY-76-C-02-0016

The impacts described here for 1985 and 1990 are based on a national energy projection which assumes medium energy demand and fuel supply through 1990 but does not incorporate the policies of the National Energy Act (NEA). This scenario, referred to as the Projection Series C or the TRENDLONG MID-MID scenario, is one of six possible energy futures developed by the DOE Energy Information Administration for the Department's 1977 Annual Report to Congress. It was chosen as representative of the official DOE national energy projections when this project was initiated, prior to the passage of the National Energy Act. Since the RIIA program is part of an ongoing review of the regional impact of energy policies, the next phase will examine the National Energy Act (NEA) and initiatives suggested by the President's second National Energy Plan. However, since coal utilization increases under the NEA, in general, impacts identified in the TRENDLONG Series C Scenario

should provide a framework for the discussion of impacts by NEA. The environmental impacts discussed in this volume are for Federal Region I (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut). However, there are nine companion volumes, one for each of the other Federal Regions. (ERA citation 05:020735)

BNL-51136 PC **A04**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Regional Issue Identification and Assessment Program (RIIA). Environmental Impacts and Issues of the EIA MID-MID Scenario: Federal Region II (New York and New Jersey).
J. Brainard, and J. S. Munson. 1 May 79, 55p
Contract EY-76-C-02-0016

The impacts described for 1985 and 1990 are based on a national energy projection (scenario) which assumes medium energy demand and fuel supply through 1990 but does not incorporate the policies of the National Energy Act (NEA). This scenario, referred to as the Projection Series C or the TRENDLONG MID-MID scenario, is one of six possible energy futures developed by the DOE Energy Information Administration for the Department's 1977 Annual Report to Congress. It was chosen as representative of the official DOE national energy projections when this project was initiated, prior to the passage of the National Energy Act. The environmental impacts discussed in this volume are for Federal Region II, comprising New York and New Jersey. (ERA citation 05:020736)

CONF-790758-(V.1) PC **A15**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Department of Energy's Regional Solar Updates 1979. Volume One. Federal Program Presentations and National Solar Data Program.
1979, 328p
Contracts EG-77-C-01-4042, EX-76-A-29-1020
DOE regional solar update conference, Dearborn, MI, USA, 11 Jul 1979.

Twelve papers are included. One was abstracted for EDB previously. Separate abstracts were prepared for eleven papers. (ERA citation 05:022152)

CONF-791009-38 MF **A01**
Oak Ridge National Lab., TN.
Regional Analysis of Future Commercial Energy Demand.
K. Corum, and S. Cohn. 1979, 7p
Contract W-7405-ENG-26
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.
Microfiche copies only.

The modification of a national model of energy use in the commercial sector to project energy use for the 10 Federal regions is described. In particular, regional floorspace and energy-use data are developed and incorporated into the regional model. Finally, the revised model is used to project regional energy use to the year 2000, and some of the regional variation in the projection is analyzed. (ERA citation 05:020802)

CONF-7910153-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
National Energy Problem in Perspective.
J. P. Sanders. 1979, 16p
Contract W-7405-ENG-26
Electrical engineering meeting, Huntsville, AL, USA, 26 Oct 1979.

A study of the history of energy usage in this country will indicate a take off occurred in our energy consumption rate in the mid-1950s; this was followed by an increase in the use of electricity as a more convenient energy source in the mid-1960s. Associated with the generation of increasing amounts of electricity were the conversion losses that are inherent in normal steam cycles. Our future needs can be projected on the basis of the population growth and the energy consumption rate per capita. An extrapolation of these needs minus the amount of fossil fuel that we can obtain or afford to import shows clearly the demand placed on domestic supplies. After an allowance is made for the remaining fossil reserves plus optimistic projections for energy from geothermal, hydroelectric, oil shale, and solar sources, a deficit remains. It appears that nuclear fission energy is the only deveoped source that has a possibility of filling this deficit between the present and the year 2000. Past that date, there is hope that nuclear fusion energy or some other of the developing technologies will be available to supply the need. (ERA citation 05:024194)

CONF-800403-43 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Global Perspective on Energy.
T. D. Anderson. 11 Apr 80, 16p
Contract W-7405-ENG-26
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

The technological world of today finds us with a population of over 4 billion with a doubling time of 30 to 40 years. Even with the rapid introduction of effective fertility control, the momentum of population - a phenomenon caused by a population age structure biased toward the young - will carry us to a population of 12 to 16 billion in the 21st century. With fixed land resources, the energy inputs to support the increased population will be several tims the present world energy consumption. How does this conclusion square with the notion that we are running out of energy. Are the billions of new people doomed to malnutrition and disease because we cannot provide the energy needed to support them. Answering in the negative, the author says: (1) proved reserves of conventional energy resources are substantial and the prospects of adding to these reserves are good; (2) unconventional resources of oil, gas, and uranium are many times larger than our present conventional reserves; and (3) nuclear fisson energy alone could support the world for several centuries. Even though the general energy picture is bright, the outlook for the less developed countries is not, he feels. To exploit the energy sources of the future requires large capital investments - something that only the developed countries can manage. One of the major contributions the developed countries can make to those that are less fortunate is to take the pressure off oil so as to stabilize the price and supply situation. In this regard, the US is in an excellent position to take the lead. (ERA citation 05:024193)

CONF-800706-1 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Energy Saving Concepts in an Existing Facility.
E. R. White. 1980, 8p
Contract AC07-76ID01570
Western plant engineering conference, Anaheim, CA, USA, 15 Jul 1980.

Two examples of energy conservation at the LOFT facility at the Idaho National Engineering Laboratory are described, including the factors that motivated the plant engineer to conceive and institute the conservation measures. In one energy conservation measure, only an operating procedure was changed, and in the other a modification to the facility was required. (ERA citation 05:022499)

COO-2608-3 PC **A04**/MF **A01**
Corning Museum of Glass, NY.
Evacuated Tubular Collector Utilizing a Heat Pipe. Final Report, August 1-September 30, 1977.
U. Ortabasi. 1977, 60p
Contract EY-76-C-02-2608

The evaluation of three evacuated tubular solar collector designs is reported: heat pipe cusp; counter flow cusp; and counter flow/flat plate. Comparative field testing of 4' x 4' modules was completed for all three designs. Thermal analysis of data shows that the evacuated heat pipe/cusp collector is a viable concept, more suitable for medium to high temperatures and high solar flux intensities. (ERA citation 05:023950)

COO-2738-33 PC **A07**/MF **A01**
AAI Corp., Baltimore, MD.
Solar Concentrator on Padonia Elementary School. Final Report.
Aug 79, 127p
Contract EY-76-C-02-2738

The Padonia installation, its operational procedures, and maintenance requirements are described. The system design, performance data, operational logic, construction drawings, and E-cube computer run to determine the heating and cooling requirements for the Padonia Elementary Cafetorium, Library, and Administrative Suite are presented in appendices. This is a hydronic system using concentrating collectors for heating and cooling. (ERA citation 05:022184)

DOE/CS/4212-T1 PC **A07**/MF **A01**
Reimann-Buechner-Crandall Partnership, Syracuse, NY.
Energy Conserving Site Design Case Study-Radisson, New York. Final Report.
Dec 79, 150p
Contract EM-78-C-01-4212

A case study of project planning and design for energy conservation at Radisson New Community, Baldwinsville, New York is described. The new community includes a 95-acre residential site and a 51-acre town center. Energy-conserving plans developed for both sites have focused on passive measures to reduce energy use for space heating. Utility systems options have been identified for both sites. The case study overview contains data on location, climatology, local meteorology. Development plans for both the residential and town center areas are described. After a description of the team structure, methodological considerations, and impediments to implementation, the implementation program is given. (ERA citation 05:016090)

DOE/CS/50066-1 MF **A01**
Champlain Technology, Inc., West Palm Beach, FL.
Identification of Federal Aviation Administration Regulations and Procedures That Impact Fuel Consumption.
J. B. Mckinly. Oct 79, 127p
Contract AP01-79CS50066
Microfiche copies only.

The impact of the Federal Aviation Regulations (FARs) on fuel conservation in the air-transportation system. To date there exist over 89 identifiable fuel-conservation program and research areas. Operational constraints in the areas of FARs and Air Traffic Control (ATC), which hinder further fuel savings in any of the 89 program and research areas, are identified. The nature of this investigation presents an update of analyses from previous FAA, DOE, and NASA publications from a DOE viewpoint. The short duration and cost constraints of this study did not allow an assessment of safety, social, or any of the broader impacts of the regulations. However, this study was not intended to solve all of the regulatory problems. Rather, this was a cursory review of the FARs intended to pinpoint those fuel inefficient regulations which could be changed to improve the overall fuel-conservation effort in the air transportation industry. The program and research areas identified as being negatively impacted by FARs were analyzed to quantify the fuel savings available through revision or removal of those constraints. A recommended list of new R and D initiatives are proposed in order to improve fuel efficiency of the FARs in the air-transportation industry. (ERA citation 05:022577)

DOE/EIA/CR-0016-02 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY.
Comparative Assessment of Five Long-Run Energy Projections.
A. S. Kydes, and J. D. Pearson. Dec 79, 134p
Contract AC02-76CH00016

This rport compares five major long-term forecasts prepared under similar assumptions by: Professor George Dantzig's PILOT Process Integrated Model/Welfare Equilibrium Model system (PILOT); Professor Alan S. Manne's ETA-MACRO energy-economy model system; The combined Brookhaven National Laboratory/Dale W. Jorgenson Associates (BNL/DJA) energy-economy model system; The FOSSIL2 energy model operated by the Office of Policy and Evaluation in the Department of Energy; The Long-range Energy Analysis Package energy model ARC-78 (LEAP), operated by the Energy Informaion Administration in the Department of Energy. After summarizing the method of preparation of each forecast, the report compares the results in detail and explains the differences both in terms of data assumptions and methodological approach. (ERA citation 05:022485)

DOE/EIA-0042(78) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Data Report: International Petroleum Annual, 1978.
11 Apr 80, 40p

This document contains information on the supply and demand of crude oil and refined products in the world. Production, imports, and exports are given for crude oil and refined products for the two most recent years available. Also given are stock changes in crude petroleum, domestic demand for refined products, and total refinery throughput or output. Information on imports, output, exports, and domestic demand are quantified for the current year for gasoline (aviation and motor), kerosene and jet fuel, distillate fuel oil, residual fuel oil, lubricants (including grease), and other refined products. World crude oil production and domestic demand are shown for each of the eleven most recent years. Information is shown for most of the world's countries, areas of the world (North America, Central America nd the Caribbean, South America, Western Europe, Middle East, Africa, and Asia), and their combined totals. Data for the Sino-Soviet area are included except for data concerning itemized refined products. This document also tabulates retail prices of motor gasoline (regular and premium), household kerosene, motor lubricating oil, distillate fuel oil, and bunker "C" fuel oil for selected cities in 56 major countries. Data are given in barrels per day and barrels where applicable. A narrative highlights the major developments for the two most recent years. 1 figure, 14 tables. (ERA citation 05:021768)

DOE/EIA-0184/30 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Distributional Analysis of Trends in Energy Expenditures by Black Households. Analaysis Report AR/IA/80-70.
J. M. Brazzel, and L. J. Hunter. Jan 79, 124p

This paper presents an analysis of projected trends in direct energy expenditures among black and white households classified by location, age and sex of the household head, and income. Estimates of changes in the distribution of energy expenditures among groups of black and white households are compared for 1974 and 1985. On the average, black households have lower income, larger families, drive older cars, and live in older and less energy-efficient homes. The analysis pursued here is intended to show how these determinants of energy consumption are reflected in black/white comparisons of energy expenditures. The 1985 projections are based on the mid-term 1985 energy Projection Series A through F prepared by the EIA for its 1977 Annual Report to Congress. The EIA energy Projection Series were based on differing assumptions with regard to: growth rates of economic activity; the probable levels of recoverable US oil and gas resources; and oil impon prices. Then present energy policy was assumed to continue. (ERA citation 05:022487)

DOE/EIA-0184/31 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Analysis of President Carter's Program to Reduce Utility Oil Consumption 50 Percent by 1990.
B. O'Brien, and G. Price. Dec 79, 50p

This analysis report projects electric utility oil consumption in 1990 with and without the implementation of President Carter's proposed program to reduce current oil consumption 50 percent by 1990. Several case studies are analyzed to determine the impact of the program on electricity prices and the capital expenditures required to accomplish the reduced oil consumption goal. (ERA citation 05:022609)

DOE/EIA-0201/8 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Use of Federal Lands for Energy Development. Energy Policy Study. Volume 8.
E. Porter. Mar 80, 125p

Assuming that domestic energy resources continue to be developed by the private sector, the government faces the policy problem of transferring Federal lands to private control in such a manner as to both promote the efficient development of the resource and secure the public a maximum share of the return from such development. A system of direct sale of such development rights at a rate and in an order determined by private demands is shown to satisfy both goals perfectly in a world without uncertainty or market imperfections. Either uncertainty or market imperfection will result in failure of such a scheme to achieve one or both goals, so that a variety of modified policy approaches have been devised. Each of these modifications is itself imperfect, however, and unless carefully matched to the specific imperfection characteristic of the result to which it is applied, may actually aggravate the shortfall from the efficiency or revenue goals. Review of existing Federal lands policy reveals a wide range of these approaches, with three general problems: (1) in certain instances, regulatory devices adopted are inappropriate as corrective devices for major market imperfections characteristic of the resource; (2) more generally, the devices adopted generate new distortions of the resource-development pattern potentially more serious than those being corrected; and finally, fragmentation of resource development authority in the Federal government sharply reduces prospects for existing programs to plausibly improve on either the efficiency or revenue consequences of a direct-sale approach. (ERA citation 05:020745)

DOE/IA-0001T/3(80) PC **A03**/MF **A01**
Department of Energy, Washington, DC.
International Energy Indicators.
E. K. Bauer. Mar 80, 30p

For the international sector, a table of data is first presented followed by corresponding graph of the data for the following: (1) Iran: crude oil capacity, production, and shut-in, 1974 to February 1980; (2) Saudi Arabia (same as Iran); (3) OPEC (ex-Iran and Saudi Arabia); capacity, production, and shut-in, 1974 to January 1980; (4) non-OPEC Free World and US production of crude oil, 1973 to January 1980; (5) oil stocks: Free World, US, Japan, and Europe (landed), 1973 to 1979; (6) petroleum consumption by industrial countries, 1973 to October 1979; (7) USSR crude oil production, 1974 to February 1980; (8) Free World and US nuclear generation capacity, 1973 to January 1980. For the United States, the same data format is used for the following: (a) US imports of crude oil and products 1973 to January 1980; (b) landed cost of Saudi Arabia crude oil in current and 1974 dollars, 1974 to October 1979; (c) US trade in coal, 1973 to 1979; (d) summary of US merchandise trade, 1976 to January 1980; and (e) US energy/GNP ratio (in 1972 dollars), 1947 to 1979. (ERA citation 05:020740)

DOE/IR/10291-T1 PC **A04**/MF **A01**
Development Sciences, Inc., East Sandwich, MA.
Education and the Energy Crisis: Policies and Actions for the Department of Energy.
22 Jan 80, 62p
Contract AC05-79IR10291

This report is the result of a study carried out to determine options and alternatives for the Education Programs Division (EPD) of the Department of Energy. In the conduct of this study, numerous individuals from various concerned institutions were interviewed. While the project scope clearly precluded contact with every involved or potentially involved party, a concerted effort was made to obtain a representative sampling of the opinions and views of relevant government, academic and private sector agencies and organizations. A listing of those contacted, excluding the Department of Energy, is provided. In addition to interviews, an extensive range of literature was drawn upon including memoranda, brochures, program statements, school-enrollment data, speeches and the like. It was determined during this study that a wide range of public and private institutions are actively involved in the energy-education field. Oil companies, utilities, public interest groups, schools, agencies at every level of government, and others are formulating and delivering education which is enormously varied. It was concluded, however, that the public is not being reached, partially because current efforts are unfocused and partially because the public has become inured to problems and resistant to many of the traditional means of education. The study found that within this crowded and varied energy education field the Department of Energy is well placed to begin to provide direction and focus to the widespread activity now occurring. (ERA citation 05:022616)

DOE/JPL-1012-25(V.1) MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume I. AN Insolation, Array Shadowing, and Reflector Augmentation Model.
J. H. Smith. 15 Jan 80, 312p
Contract EX-76-A-29-1012
Microfiche copies only.

This handbook provides estimates of average available solar insolation to fixed, flat-plate, south-facing collector surfaces at various array tilt angles at numerous sites in the US. This first volume contains average daily, total insolation estimates, by month, and annual totals for 235 locations. A model that estimates the direct, diffuse, and reflected components of total insolation on an hourly, daily, and monthly basis is presented. A shadow loss model and a reflector augmentation model providing estimates of the losses and gains associated with various fixed array geometries are also described. These models can be used with the insolation model provided or with other recorded data. A FORTRAN computer program with user's guide is presented. The program can be used to generate additional handbook values or to examine the effects of array shadowing and fixed reflector augmentation effects on a daily, monthly, or annual basis. Array shadowing depends on location, array size, array tilt, array separation, and time. The program can be used to examine trade-offs between array spacing and insolation losses due to shadowing. The reflector augmentation program can be used to examine trade-offs among array size and tilt, separation, and reflector tilt to determine the combination of design values that optimize the economic objectives or technical criteria of the system. (ERA citation 05:021949)

DOE/JPL/1012-25(V.2) PC **A20**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume II. Average Hourly and Total Daily Insolation Data for 235 Localities (Alaska - Montana).
J. H. Smith. 15 Jan 80, 473p
Contract EX-76-A-29-1012

Average hourly and daily total insolaion estimates are given for 235 US sites at a variety of array tilt angles. (ERA citation 05:021950)

DOE/JPL/1012-25(V.3) PC **A20**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume III. Average Hourly and Total Daily Insolation Data for 235 Localities (North Carolina - Wyoming).
J. H. Smith. 15 Jan 80, 473p
Contract EX-76-A-29-1012

Average hourly and daily total insolation estimates are given for 235 US sites at a variety of array tilt angles. (ERA citation 05:021951)

DOE/PE-00/8 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Analytical Services.
Policy and Fiscal Guidance: Energy Projections. Appendix D.
Feb 80, 53p

This document, Appendix D of DOE's 1980 Policy and Fiscal Guidance, presents a set of energy projections for use in strategic-planning activities. The forecasts reflect assumptions about key input variables - world oil prices, economic growth, nuclear capacity, domestic oil production potential, and policy initiatives - that are consistent with information available to the Office of Policy and Evaluation as of February 1980. These projections use the same analytical framework as those presented in the Second National Energy Plan (NEP-II), pub-

lished in May 1979. This analytical framework is described in Appendices A and B of NEP-II (available from the Office of Analytical Services). The projections differ from those published in NE-II in the following assumptions: (1) world oil prices are higher, reflecting the June and December 1979 OPEC price hikes and the current instability in world oil markets; (2) GNP growth is lower than NEP-II, primarily a result of the expected recession in 1980; (3) domestic oil production is lower due to a reevaluation of lower-48 and offshore oil production potential; (4) nuclear capacity is assumed to expand at a slower rate of growth; and (5) Presidential initiatives are incorporated into the analysis, including the windfall profits tax bill H.R. 3919, synfuel corporaton legislation S.932, utility oil backout program - 750,000 bbls/day savings by 1990 to 1995, and conservation savings of 250,000 bbls/day. (ERA citation 05:024196)

DOE/PE-0019-02 MF **A01**
Department of Energy, Washington, DC. Office of Competition.
State of Competition in Gasoline Marketing. Part I. The Effects of Refiner Operations at Retail (A Study Required by Title III of the Petroleum Marketing Practices Act).
J. B. Delaney, and R. N. Fenili. 1979, 359p
Microfiche copies only.

This Appendix contains the entire record of the regional hearing conducted in Fort Wayne, Indiana on August 21, 1979. In addition to the transcript of the proceedings, written statements submitted at the hearings are reproduced. Written responses to questions and comments received by the Office of Competition after the date of the hearing are included. (ERA citation 05:021770)

DOE/PR-0038 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Department of Energy Procurement and Financial-Assistance Career Guide.
May 80, 30p

This guide supports the Procurement Career Management and Development Program which is administered by the Procurement Career Management and Development Board. Objectives are: (a). To meet current and future DOE-wide needs for procurement and financial-assistance people and to provide capable replacements for key procurement and financial-assistance positions on a planned, systematic basis. (b). To attract, select, develop and retain, on a long-term career basis, a higly qualified workforce capable of performing current and future DOE procurement and financial assistance functions. (c) To increase the proficiency of DOE procurement and financial-assistance people in their present positions and to give talented people opportunities for broadening experiences and progression commensurate with their abilities. (d) To stimulate self-development. The program applies to all procurement and financial-assistance people, or those who perform key related function, in DOE who are serving under career or career-conditional appointments in the competitive service. (ERA citation 05:024173)

DOE/TIC-11177 PC **A05**/MF **A01**
Systemetrics, Inc., Blacksburg, VA.
Literature Review on Capacity Expansion Planning under Uncertainty. Phase II.
A. L. Soyster. 15 Mar 80, 84p
Contract EI-78-C-01-6242

A literature review is presented concerning the issues and methodologies for modeling investment and capacity-expansion decisionsof the firm. The specific thrust of the review involves the treatment of uncertainty, especially in the context of capacity for the regulated utility. The first section, completely methodological in scope, is devoted to formal methods for incorporating uncertainty into mathematical programming models. The four different approaches considered are: two stage programming with recourse, chance-constrained programming, distributional analysis, expected-value/variance tradeoffs. Each of these approaches has been used or is recognized as a possible framework for models devoted to investment and capacity-planning decisions. Next, two different contemporary electric-utility capacity-expansion models are reviewed. Capacity planning for the regulated utility and a review of some econometrically based capacity expansion models are included. 44 references. (ERA citation 05:024211)

GJBX-112(80) PC **A06**/MF **A01**
Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
Probabilistic Endowment Appraisal System Based Upon the Formalization of Geologic Decisions. General Description.
D. P. Harris, and F. J. Carrigan. Apr 80, 106p
Contract EY-76-C-13-1664

The objectives of this study include the design of an appraisal system which has the following features: estimates uranium endowment, not resources; formalizes the geologist's geoscience and assists the geologist in the exercise of his geoscience; describes the probability distribution for uranium endowment; diminishes or at least does not contribute to psychometric biases; provides for anonymous exchange among multiple experts of tenets of geoscience, but not the exchange of endowment estimates; provides an endowment estimate based upon geoscience only; is not easily gamed or manipulated; and provides for a quick and easy review of geoscience and resource information. This report is reflective of its title, a general description. The appraisal system resulting from this research is complex in the detail of its design and use. However, the major concepts which are reflected by the system are simple. The purpose of this report is to establish clearly these major concepts and the manner in which the system applies these concepts. Many details, refinements, and caveats are purposefully suppressed in order to provide this general description. While this suppression is a loss to some readers, it is a benefit to a wider spectrum of readers. Those interested in the nuts and bolts of the system will also want to read the user's manual which accompanies this general description. (ERA citation 05:023673)

INIS-mf-5424 PC **A02**/MF **A01**
Netherlands Energy Research Foundation ECN, The Hague.
Summary of Activities July 1978 - July 1979.
Jul 79, 8p
U.S. Sales Only.

A brief sketch is first given of the current energy situation in the Netherlands and recent developments in this field. Against this background the main activities of the Netherlands Energy Research Foundation ECN are then given for the period between 1st July 1978 - 30th June 1979. Information on organization and staffing applies to the latter date. The financial figures at the end are taken from the latest annual report (in Dutch) and refer to the calender year 1978. (Atomindex citation 11:503205)

Juel-Spez-55 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung.
Alternative Scenario for Energy Policy: Analysis, Questions, and Remarks on Dr. Erhard Eppler's Alternative Scenario for Energy Policy.
K. Schmitz, and A. Voss. Sep 79, 75p
In German.
U.S. Sales Only.

The energy-political proposals and strategies presented by E. Eppler on 30 May 1979 his alternative energy policy are critically analyzed and evaluated. One main factor is to test the basic facts and analyses and the correctness of the decisions. Whether the energy-political measures proposed by E. Eppler can be transferred to reality is the question. An analysis of the most striking statements of the scenario shows that especially the numerous restrictions (concentration on the electricity section, no incorporation of energy supply in the total economical development, etc.) and an overestimation of the importance of energy savings make it impossible to realize this concept within the frame of a responsible energy policy. (ERA citation 05:024204)

LA-UR-80-852 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Active Solar Collector and Materials Research.
D. A. Neeper. 1980, 3p CONF-800340-1
Contract W-7405-ENG-36
DOE active solar heating and cooling contractors' review meeting, Lake Tahoe, NV, USA, 26 Mar 1980.

Work completed on various collectors is listed. (ERA citation 05:023952)

LA-8347-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Modeling the Number of Bids Received on Federal Offshore Hydrocarbon Leases by Poisson-Type Models.
C. J. Nachtsheim, and L. A. Bruckner. May 80, 20p
Contract W-7405-ENG-36

Since 1954, the federal government has held over 40 hydrocarbon lease sales on the Outer Continental Shelf. A maximum of 18 sealed bonus bids was received for each of the tracts offered. A mixed Poisson-type model has been suggested for the relative frequencies of the number of bids received by an offered tract. Here we show that statistically this model may only be supportable for the number of solo bids received in sales after the Joint-Bidding Ban of 1975. A truncated model (excluding tracts receiving no bids) is proposed. While an improvement results from the use of this model, it appears that models of the mixed Poisson-type may not be generally applicable to the number of bids data. (ERA citation 05:023601)

LBL-10221 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Optical Properties of Small Particle Suspensions for Solar Thermal Collection.
A. J. Hunt. Feb 80, 6p CONF-800339-2
Contract W-7405-ENG-48
Optical phenomena peculiar to matter of small dimension, Tucson, AZ, USA, 18 Mar 1980.

A dispersion of very small absorbing particles forms an ideal medium to absorb radiant energy, transform it to sensible heat, and efficiently transfer the heat to a surrounding fluid. Because the absorption occurs within the fluid, the temperature drops that occur across the walls of conventional solar receivers are eliminated, resulting in higher efficiencies and lower operating temperatures. The optical properties of a Small Particle Suspension (SPS) may be tailored to the spectrum of the incoming radiation to maximize the absorption and minimize the reradiation of thermal energy. Thus a SPS offers the features of a selective surface absorber, but with the advantages of direct absorption within the fluid. The optics of radiant energy collection by particle suspensions and a study on ultrafine carbon particles are discussed. (ERA citation 05:022225)

LBL-10320 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Energy Analysis Program, FY 1979.
Apr 80, 78p
Contract W-7405-ENG-48

Twenty-six brief summary reports from LBL's Energy Analysis Program are included. Energy analysis attempts to understand the volitional choices of energy use and supply available to human society, and the multi-faceted consequences of choosing any one of them. Specifically, the reports deal with economic impacts; assessments of regional issues and impacts; air quality evaluation; institutional and political issues in California power plant siting; assessment of environmental standards; water issues; characterization of aquatic systems dissolved oxygen profiles; modeling; EIA energy scenarios for Region 9; computer-generated interactive graphics; energy assessment in Hawaii; solar energy in communities; utilities solar financial data; population impacts of geothermal development; energy conservation in colleges and residential sectors; energy policy; decision making; building energy performance standards; standards for residential appliances; and impact of energy performance standards on demand for peak electrical energy. (ERA citation 05:022486)

MLM-2702(OP) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Evaluation of Solar Pond Performance.
L. J. Wittenberg. 1980, 2p CONF-800340-3

Contract EY-76-C-04-0053
DOE active solar heating and cooling contractors' review meeting, Lake Tahoe, NV, USA, 26 Mar 1980.

The City of Miamisburg, Ohio, constructed during 1978 a large, salt-gradient solar pond as part of its community park development project. The thermal energy stored in the pond is being used to heat an outdoor swimming pool in the summer and an adjacent recreational building during part of the winter. This solar pond, which occupies an area of 2020 m exp 2 (22,000 sq. ft.), was designed from experience obtained at smaller research ponds located at Ohio State University, the University of New Mexico and similar ponds operated in Israel. During the summer of 1979, the initial heat (40,000 kWh, 136 million Btu) was withdrawn from the solar pond to heat the outdoor swimming pool. All of the data collection systems were installed and functioned as designed so that operational data were obtained. The observed performance of the pond was compared with several of the predicted models for this type of pond. (ERA citation 05:023953)

N80-26764/4 PC**$15.00**
National Aeronautics and Space Administration, Washington, DC.
Energy: A Continuing Bibliography with Indexes.
Apr 80, 412p NASA-SP-7043(25)

This bibliography lists 1428 reports, articles, and other documents introduced into the NASA scientific and technical information system from January 1, 1980 through March 31, 1980.

N80-26774/3 PC **A04**/MF **A01**
Toledo Univ., OH.
Nonlinear Aeroelastic Equations of Motion of Twisted, Nonuniform, Flexible Horizontal-Axis Wind Turbine Blades.
Final Report.
K. R. V. Kaza. Jul 80, 70p NASA-CR-159502, DOE/NASA/3139-1
Grant NSG-3139, Contract EX-76-I-01-1028

The second-degree nonlinear equations of motion for a flexible, twisted, nonuniform, horizontal axis wind turbine blade were developed using Hamilton's principle. A mathematical ordering scheme which was consistent with the assumption of a slender beam was used to discard some higher-order elastic and inertial terms in the second-degree nonlinear equations. The blade aerodynamic loading which was employed accounted for both wind shear and tower shadow and was obtained from strip theory based on a quasi-steady approximation of two-dimensional, incompressible, unsteady, airfoil theory. The resulting equations had periodic coefficients and were suitable for determining the aeroelastic stability and response of large horizontal-axis wind turbine blades.

N80-26833/7 PC **A08**/MF **A01**
Institut Francais de l'Energie, Paris.
Guide for Energy Compatibility.
M. J. Braun, and J. Lefebvre. May 79, 160p NP-24016, REPT-65
Text in French.

A guide for the energy manager in the acquisition and processing of data necessary for energy conservation is presented. Energy conservation is defined and its objectives outlined. The principles and characteristics of measurement devices used are given. The use of the measurements in the establishment of energy balances is described. Examples are given of establishments that have instituted energy conservation plans. Tables are presented of comparative characteristics, by manufacturer and by type of measurement device, for 300 manufacturers operating in the French market.

N80-26879/0 PC **A11**/MF **A01**
Austrian Solar and Space Agency, Vienna.
Collector Test Methods: Analysis of Test Methods for the Determination of the Thermal Efficiency of Flat-Plate Collectors.
M. Bruck, W. Heindl, H. Koch, G. Schaffar, and P. Varga. Sep 79, 236p ASSA-FA-10, ISBN-3-7041-0050-1
Sponsored by Austrian Federal Ministry of Science and Research.

Test methods were evaluated for the determination of the thermal efficiency of flat-plate solar collectors with a liquid as the transfer fluid by means of a mathematical simulation. A comparison of experimental results obtained from tests conducted by the National Bureau of Standards (NBS) and by the International Energy Agency (IEA) with the results of the theoretical analysis shows that the observed scatter of data is primarily caused by systematic errors when conducting the test. However, the scatter is also caused by production-dependent changes of the collector properties and by the fact that ambient conditions were not sufficiently considered. The analysis of the test methods by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and by the Bundesverband fuer Solarenergie (BSE) showed that the BSE standard yields better results - particularly for the climatic conditions in Central Europe - than the ASHRAE standard. A simple correction of the systematic deviations observed in BSE tests, causec by the fact that the temperature of the absorber is lower than of the transfer fluid, is suggested.

ORNL-5587 PC **A18**/MF **A01**
Oak Ridge National Lab., TN.
Regional Analyses of Highway Energy Use.
G. Kulp, D. L. Greene, G. H. Walton, M. J. Collins, and D. B. Shonka. Apr 80, 425p
Contract W-7405-ENG-26

Regional variation among selected factors affecting energy use in highway transportation is described and analyzed. Highway vehicle use accounts for about 95% of all motor gasoline used and a substantial portion of the diesel fuel consumed in the US. For the purposes of analysis, highway energy use can be divided into three sectoral users: household, commercial, and government. Chapter 1, Nonhighway Use of Gasoline, covers agriculture, marine, aviation, industrial and commercial, construction, snowmobiles, and motorcycles. Chapter 2, Topics in Commercial Highway Energy Use, includes the following: Commercial Use of Gasoline in Highway Transportation, Automotive Fleets and Electric Vehicle Applicability; Local and Short-Haul Commercial Trucking; Intercity Trucking; and Intracity Bus Service. Chapter 3, Selected Characteristics of Highway Energy Use by the Household Sector, includes sections entitled: Regional Gasoline Use; Ownership of New and Used Vehicles; Fuel Efficiencies and Market Shares of New Vehicle Registrations; Regional Trends in Import Passenger Car Sales and in Light Truck and Van Sales; Regional Variations in Recreational Vehicle Shipments and in Gasoline Consumption, 1977; Regional Patterns of Motorcycle and Moped Use; and An Analysis of the Differences in Carpooling Across Metropolitan Areas. (ERA citation 05:022584)

ORNL-5636 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Spatial Data on Energy, Environmental, Health, and Socio-Economic Themes at Oak Ridge National Laboratory: 1979 Inventory.
E. D. Copenhaver, and J. F. Barker. May 80, 126p
Contract W-7405-ENG-26

Spatial data files at Oak Ridge National Laboratory addressing energy, environmental, health, and socio-economic themes are described. In order to be included in this inventory, data files must reside at ORNL, be numeric, have some spatial attribute, and have potential for exchange or external use. Most of the files described are available on a cost-recovery basis. The inventory is indexed by content, geographic coverage, and contact person. In addition, a short description of each data file is provided, including technical documentation, original data source, availability limitations, and associated software where pertinent. (ERA citation 05:024175)

PB80-195167 PC **A05**/MF **A01**
Atmospheric Research and Technology, Inc., Sacramento, CA.
Wind Resource Assessment in California.
Contractor rept. (Final),
Edwin X. Berry. May 80, 77p CAEC-51, CAEC-500-80-024

The report provides a strategy for wind-energy prospecting, a design for a wind prospecting instrument, and a method of analysis of wind-energy data. The formulation also produces an improved basis for the calculation of wind machine performance using only a few wind parameter measurements.

PB80-195381 PC **A03**/MF **A01**
California Univ., Berkeley. Sea Water Conversion Lab.
How to Build a Solar Still,
Lee Edson, Horace McCracken, and James Weldy. 15 Jun 66, 27p

Directions for the construction of an inexpensive solar still for utilizing the sun's energy to convert salt water to fresh are presented. Information is given on the materials needed, directions for the use of the still, and expected production rates. This solar still can be built from materials available in most lumber yards, metal-supply houses, and plastic-supply stores. Illustrations are provided for use in the construction of the still.

PB80-195654 PC **A05**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
Illinois State Plan: Energy Conservation in Institutions, Institutional Buildings Grant Program,
Steven K. Thomas, Steven L. Tuma, and John Shum. 5 Dec 79, 99p ILLDOE-79-28
Prepared in cooperation with Contract Research Corp., Chicago, IL.

This Plan addresses very narrow April 17, 1979 Federal Register requirements as spelled out in paragraph 455.42 and is meant to show the Institute's strategies and commitments to achieve full implementation of this Energy Grant Program in Illinois. The Program provides for Federal Grant monies on a 50/50 cost-sharing basis to be given to eligible Schools/Hospitals/Public Care/Local Units of Government to both conduct in-depth Professional Engineering Analysis of each of the applicant's buildings and finally to enable the procurement and installation of some or all of the report retrofit recommendations on the same cost share basis.

PB80-196090 PC **A03**/MF **A01**
Seattle City Light Dept., WA. Office of Conservation.
Office of Conservation (Seattle, Washington): 1979 Annual Report,
Sara Patton, and Robert H. Murray. 1979, 46p

This report reviews Seattle City Light Conservation Program activities.

PB80-196108 PC **A21**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Estimates of the Costs of Renewable Energy Technologies for New York State.
Final rept. Jan-Jul 79,
Christopher Pleatsikas, and Douglas Funkhouser. Jul 79, 487p NYSERDA-79-7

This study of renewable and indigenous resources in New York State was funded by the New York State Energy Research and Development Authority. The results are a compendium of estimates of costs associated with the energy produced by solar, wind, small hydropower, geothermal, biomass, and resource recovery technologies. Where possible, data specific to New York were employed or national or regional data were adjusted to reflect the climatological, geographical, and other basic circumstances in the State.

PB80-197791 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Vehicle Fuel Economy: Track versus Dynamometer.
Technical rept.,
Bruce Grugett. Jun 80, 8p EPA-AA-SDSB-80-8

In a recently completed program a 1979 Chevrolet Nova was operated over EPA driving cycles on a test track at the Transportation Research Center in Ohio and on a chassis dynamometer at the U.S. Environmental Protection Agency's Motor Vehicle

Emission Laboratory in Ann Arbor. The data obtained in this program provide an opportunity to compare road and dynamometer fuel economy. This report discusses the results obtained from this program and discusses a dynamometer modification which would make the dynamometer fuel economy a more accurate predictor of fuel economy obtained by the vehicle on the road.

PB80-197890 PC **A02**/MF **A01**
Petroleum Conservation Research Association, New Delhi (India).
Educational Campaign for Petroleum and Fuel Conservation.
1979, 25p

The report discusses the desirability of and strategies for a campaign to encourage conservation among individual consumers of petroleum products in India. Topics covered include the potential for conservation in the unorganized consumers sector; selection of suitable messages; selection of media for the campaign; costs of achieving a desired coverage and ways of minimizing these costs; ensuring maximum effectiveness; efforts in various other countries.

PB80-198278 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA. Dept. of Physical Oceanography.
Seasonal Performance of a Brine Pond Solar Heat Collector in New England,
William S. von Arx. Mar 80, 34p WHOI-80-16, NOAA-80051304
Grant NOAA-04-7-158-44104

The principles of a modified plot scale Bloch-Tabor brine pond solar heat collector and its operation over the course of a New England winter are described. By stratifying the pond using calcium chloride, a 'cat eye' effect was produced which enabled the pond to act as a whole-sky radiation trap; the freshwater cap served as both an optical and mechanical barrier to heat loss. The pond operated at 24% efficiency in collecting solar radiation. The minimum temperature observed in the brine layer, at a time when the pond was covered by ice, was 24C and the summer maximum was 58C. Modifications to full scale systems, their shortcomings and the environmental constraints associated with this approach are discussed.

PB80-198765 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
The Effect of Tire Inflation Pressure on Vehicle Fuel Economy.
Technical rept.,
Bruce Grugett. Apr 80, 17p EPA-AA-SDSB-80-04

The technical literature indicates that most vehicles on the road are operated with underinflated tires. Since tire energy dissipation increases at lower tire inflation pressure and vehicle fuel consumption increases with increasing tire energy dissipation, a vehicle with underinflated tires will consume more fuel than it would with properly inflated tires. Consequently, a program to increase average tire inflation pressure on in-use vehicles would result in significant fuel savings. The 1977 emission factors program conducted by the U.S. Environmental Protection Agency's Motor Vehicle Emission Laboratory provided an opportunity to gather tire inflation data from in-use vehicles. This report discusses the analysis of these data and proposes a simple approach to increase tire inflation pressure and reduce U.S. fuel consumption.

PB80-199029 PC **A05**/MF **A01**
Massachusetts Dept. of Community Affairs, Boston.
Energy Management in Municipal Street Lighting.
1 Mar 77, 100p
Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

This report presents strategies to reduce the energy used in street lighting and, at the same time, reduce or stabilize the cost of street lighting to municipalities.

PB80-199466 PC **A11**/MF **A01**
Seattle City Light Dept., WA. Office of Conservation.
Evaluation 1979. A Look at Conservation Projects and Activities at Seattle City Light.
Apr 80, 232p

A partial listing of topic areas includes: Electric league attic insulation project; Heat loss; Insulation demonstration financing program; Low income elderly insulation project; Community outreach; Education outreach; Energy information center; Outdoor/decorative lighting; Solar education; Thermograms; Conservation information service; Grants; Legislative tracking; Legislature and barrier analysis; Rate review/analysis; Energy management handbooks; Neighborhood conservation demonstration.

PB80-813041 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Energy Supply and Demand Modeling. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Audrey S. Hundemann. Jul 80, 186p
Supersedes NTIS/PS-79/0665 and NTIS/PS-78/0599.

The use of energy models to estimate the supply and demand of electricity, oil, natural gas, coal, and petroleum products on national, regional, and state levels is discussed. The models cover residential, commercial, and industrial supply and demand; the impact of economic conditions on demand; energy use alternatives; and optimal allocation of regionally produced energy resources. Abstracts pertaining to design and development of energy models are included. (This updated bibliography contains 178 citations, 35 of which are new entries to the previous edition.)

SAN-1470-T2 PC **A07**/MF **A01**
Dynatrend, Inc., Arlington, VA.
Development of a Risk-Analysis Model. Final Report.
Oct 79, 140p
Contract EC-77-C-03-1470

This report consists of a main body, which provides a presentation of risk analysis and its general and specific application to the needs of the Office of Buildings and Community Systems of the Department of Energy; and several case studies employing the risk-analysis model developed. The highlights include a discussion of how risk analysis is currently used in the private, regulated, and public sectors and how this methodology can be employed to meet the policy-analysis needs of the Office of Buildings and Community Systems of the Department of Energy (BCS/DOE). After a review of the primary methodologies available for risk analysis, it was determined that Monte Carlo simulation techniques provide the greatest degree of visibility into uncertainty in the decision-making process. Although the data-collection requirements can be demanding, the benefits, when compared to other methods, are substantial. The data-collection problem can be significantly reduced, without sacrificing proprietary-information rights, if prior arrangements are made with RD and D contractors to provide responses to reasonable requests for base-case data. A total of three case studies were performed on BCS technologies: a gas-fired heat pump; a 1000 ton/day anaerobic digestion plant; and a district heating and cooling system. The three case studies plus the risk-analysis methodology were issued as separate reports. It is concluded that, based on the overall research of risk analysis and the case-study experience, that the risk-analysis methodology has significant potential as a policy-evaluation tool within BCS. (ERA citation 05:020785)

SAN-1701-T1 PC **A12**/MF **A01**
Hittman Associates, Inc., Columbia, MD.
Industrial Recovered-Materials-Utilization Targets for the Rubber Industry. Final Report.
1979, 275p
Contract EC-77-C-03-1701

Targets for utilization of energy-saving recovered materials within the rubber-products industry are presented along with the documentation supporting these proposed targets. The recovered material used in this industry is termed recovered rubber (RR), and includes reclaimed (devulcanized) scrap rubber, and waste rubber products that have been retreaded (tires) or slit into useful items. Reclaimed and ground scrap rubber are used either as a replacement for virgin rubber or as a filler material in the manufacturing of new products. While reclaimed rubber is much more widely used than ground scrap, often they are interchangeable. There is a trade-off of physical characteristics which much be considered in choosing between use of reclaimed rubber and ground scrap; however, the over-riding consideration is usually economic. As ground scrap becomes more economically attractive due to recent advances in grinding technologies, it will command a larger share of the market for recovered rubber. The rubber industry has been subdivided according to the Standard Industrial Classification system (SIC) four-digit code level. Targets have been developed for each subdivision that has potential for utilizing RR. (ERA citation 05:024319)

WIS-Ph-79/54 MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
Color Corrected Fresnel Lens for Solar Concentration.
E. M. Kritchman. 1979, 12p
U.S. Sales Only. Microfiche copies only.

A new linear convex Fresnel lens with its groove side down is described. The design philosophy is similar to the highly concentrating two focal Fresnel lens but including a correction for chromatic aberration. A solar concentration ratio as high as 80 is achieved. For wide acceptance angles the concentration nears the theoretical maximum. (Atomindex citation 11:501192)

10B. Power Sources

AD-A085 990/0 MF **A01**
Naval Air Engineering Center Lakehurst NJ Ground Support Equipment Dept
Application of a Microcomputer to a Mobile Electric Power Plant.
Final rept. Jul 75-Sep 79,
Richard F. O'Donnell. 28 May 80, 280p Rept no. NAEC-92-139
Availability: Microfiche copies only.

This report contains information relevant to a generator control system to be used in a new DOD Mobile Electric Power Plant (MEP354). An initial study revealed that a microcomputer control strategy was the most suitable system to use for this particular application. A breadboard system was built and tested to see if the controlled power complies with the applicable standard for ground power, MIL-STD-704C. Results obtained indicate that the microcomputer control system will regulate voltage and frequency to the extent called out in the aforementioned military standard. (Author)

AD-A086 035/3 MF **A01**
General Motors Corp Indianapolis IN Detroit Diesel Allison Div
Environmental and Cold Tests on Model 04045B03 Generator Set Serial Number 0000003 with IGT 404-4 Engine Serial Number T000003.
Engineering test rept.,
Harris E. Gaston. 9 Nov 79, 101p Rept no. DDA-79D87
Contracts DAAK70-78-C-0124, DAAK70-78-C-0056
Availability: Microfiche copies only.

The purpose of this test was to conduct environmental tests at +125 F, 5,000 Ft. altitude and 107 F, 8,000 Ft. altitude and 95 F and with 60 delta T (from about 80 F to 20 F). These tests were to be completed per Test Request AD5210-01-501A, Purchase Description and Military Specification Mil Std 705B. In addition, the testing was to include cold testing at -25 F and -50 F to meet the requirements of the Purchase Description and Mil-Std 705B. Model 04045B03 Generator Set S/N 0000003 (with IGT 404-4 Engine S/N T000003) was installed in Test Cell 873 for environmental tests and Cold tests on June 28, 1979. Initial ambient checkout tests were completed June 9 after correcting various test equipment problems. Engine-gen set problems involved failure of two reverse polarity diodes and several 'undervoltage load dump' incidents.

AD-A086 166/6 PC **A05**/MF **A01**
Rockwell International Anaheim CA Autonetics Strategic Systems Div
Feasibility Study B-1 Power Controller.
Final rept. Aug-Nov 79,
C. E. Young. Nov 79, 95p C79-1003/201, NADC-79134-60
Contract N62269-79-C-0294
See also Rept. no. NADC-30-TS-7602.

This report documents the feasibility of modifying and repackaging the Solid State Power Controller (SSPC) developed for the B-1 to meet the performance and configuration requirements for Advanced Aircraft Electrical System (AAES). The effort included an analysis of the applicability of the B-1 monolithic and pass elements, and the application of advance developments to meet the volumetric constraints of NADC-30-TS-7602. (Author)

AD-A086 234/2 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
DLTS Spectra and Defect Effects on Irradiated Silicon solar Cells,
P. J. Drevinsky, H. M. DeAngelis, J. T. Schott, and W. P. Rahilly. 1979, 7p Rept no. RADC/ETR-80-0016
Pub. in IEEE Photovoltaic Specialists Conference (14th), p835-839, 7-10 Jan 80.

No abstract available.

ANL-79-84 PC **A03**/MF **A01**
Argonne National Lab., IL.
Advanced Fuel Cell Development. Progress Report, April-June 1979.
R. D. Pierce, P. A. Finn, K. Kinoshita, G. H. Kucera, and R. B. Poeppel. Nov 79, 44p
Contract W-31-109-ENG-38

Advanced fuel cell research and development activities at Argonne National Laboratory (ANL) during the period of April to June 1979 are described. These efforts have been directed toward understanding and improving the components of molten-carbonate-electrolyte fuel cells operated at temperatures near 925 K. The primary focus of this work has been on the development of long-life electrolyte structures composed of LiAlO sub 2 particles and Li sub 2 CO sub 3 -K sub 2 CO sub 3 eutectic. Cell testing is performed to assess individual and collective component behavior. (ERA citation 05:024232)

BNL-27452 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fuel Cells for Electric Utility and Transportation Applications.
S. Srinivasan. 1980, 30p CONF-800324-2
Contract EY-76-C-02-0016
Seminar on electrochemical systems: batteries and fuel cells, Fortaleza-Ceara, Brazil, 2 Mar 1980.

This review encompasses the following topics: (1) historical, (2) types of fuel cells, (3) thermodynamic and electrode kinetic aspects of fuel cells, (4) overview of present status of fuel cell research and development, (5) electrocatalysis of fuel cell reactions, (6) fuel cell/battery hybrid vehicles, and (7) regenerative hydrogen-halogen fuel cells for energy storage. (ERA citation 05:024234)

BNL-51072 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fuel Cell Applied Research: Electrocatalysis and Materials. Quarterly Report, October 1-December 31, 1978.
S. Srinivasan, H. S. Isaacs, J. McBreen, W. E. O'Grady, and H. Olender. Jul 79, 36p
Contract EY-76-C-02-0016

Investigations were carried out on the sintering of carbon supported platinum catalysts in phosphoric acid at 150 exp 0 C over a 3500-hour period. The most significant result was that the sintering rate was five times slower for these electrodes as compared with unsupported platinum electrodes. After aging the electrodes for 1200 h, attempts were made to regenerate the active areas of one of the electrodes by cycling at 100 V/s in various voltage envelopes between -0.1 V and 1.1 V. These treatments were unsuccessful for regeneration of the activity. A ring-disc electrode investigation of oxygen reduction in 85% phosphoric acid was carried out. Work included determinations of the Tafel parameters, oxygen diffusivity, reaction order, and the extent of peroxide formation. Also, solid electrolyte fuel cells were studied. A cell was designed and fabricated for measurement of oxygen diffusion in interconnection materials. Both transient and steady methods are being used and diffusivity as well as concentration of diffusing species can be obtained. The cell is being calibrated by measuring oxygen diffusion in nickel foils of various thickness. Oxygen ion transport in In sub 2 O sub 3 , an oxygen electrode material, was also investigated using the oxide as a membrane, but leakage at the edges of cells prevented direct measurements. (ERA citation 05:022534)

CONF-780619-25 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Materials Science and Engineering.
Recent Investigations of Metal Oxide/CdTe Heterojunction Solar Cells.
A. L. Fehrenbruch, J. Aranovich, F. Courreges, T. Chynoweth, and R. H. Bube. 1978, 7p
Contract EY-76-S-03-0326-047
IEEE photovoltaic specialists conference, Washington, DC, USA, 5 Jun 1978.

Recent investigations of the properties of ZnO and indium--tin oxide (ITO) films both on glass and as components of single crystal p-CdTe based heterojunction solar cells are described. It was shown that ZnO films deposited by rf sputtering or spray pyrolysis can be brought within the desired conductivity range for solar cell performance. First generation n-ZnO/p-CdTe solar cells show high values of J/sub sc/ = 19 mA/cm exp 2 and solar efficiency n/sub s/ = 4.6% (AM2 simulation). Heterojunctions of n-ITO/p-CdTe prepared by rf sputtering give V/sub oc/ = 0.82 V, J/sub sc/ = 14.5 mA/cm exp 2 , and n/sub s/ = 8% but properties are very sensitive to preparation variables. Preliminary structural studies have been made on the ITO films in situ on CdTe substrates to elucidate this sensitivity. The results of heat-treatments on both ZnO and ITO cells are also discussed. (ERA citation 04:046066)

CONF-781266-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Outlook for Nuclear Fission Energy.
T. D. Anderson. 1978, 13p
Contract W-7405-ENG-26
Annual international conference on energy, Washington, DC, USA, 1 Dec 1978.

The electric utility industry has made a substantial commitment to nuclear power. The industrial capability to produce nuclear plants is large and well established. Nevertheless, nuclear energy in the United States is at the crossroad, and the direction it will take is not at all assured. The postponements, cancellations, and lack of orders for new plants over the past three years raise some serious questions about the future. The present problems of nuclear energy are primarily nontechnical in nature. If the nontechnical issues can be resolved, the future for nuclear looks bright indeed. The LWR and other converters could provide strong competition for coal and other electric power options for a half century or more. If development goals are met, the nuclear breeder offers the prospect of a very large supply of energy at stabilized prices over a time span of centuries. (ERA citation 05:022376)

CONF-790631-(V.1) PC **A23**/MF **A01**
Department of Energy, Washington, DC. Div. of Central Solar Technology.
Ocean Thermal Energy for the 80'S.
G. L. Dugger. 1979, 549p
OTEC conference, Washington, DC, USA, 19 Jun 1979.

Separate abstracts were prepared for 57 of the 62 papers included in this volume. Five papers were previously included in the data base. (ERA citation 05:022048)

CONF-790631-(V.2) PC **A19**/MF **A01**
Department of Energy, Washington, DC. Div. of Central Solar Technology.
Ocean Thermal Energy for the 80'S.
G. L. Dugger. 1979, 450p
OTEC conference, Washington, DC, USA, 19 Jun 1979.

Separate abstracts were prepared for 44 of the 55 papers presented in this volume. Eleven papers were previously included in the data base. (ERA citation 05:022105)

CONF-791102-166 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
1000-KVA Arc Power Supply.
R. E. Wright, G. C. Barber, and N. S. Ponte. 1979, 3p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Because of ever-increasing power demands for the development of the Oak Ridge duoPIGatron ion source, a continuous-duty arc power supply was constructed for the Medium Energy Test Facility (METF) to furnish power for the plasma generator of experimental ion sources. The power supply utilizes 12-pulse rectification with half-wave switching in a delta and wye full-wave bridge that may be connected in series or parallel. It will deliver 340 V dc, 2500 A to an ion source when series connected and 170 V dc, 5000 A when paralleled connected. Silicon-controlled rectifiers (SCR) in each rectifier bridge can be switched for pulses as short as 10 ms through continuous duty. The filter section that reduces the ripple in the output consists of an inductor-to-capacitor (L-C) filter to smooth the 720-Hz pulses. The power transformer serves as an isolation transformer allowing the secondary to be elevated to the accelerating potential of the ion source. The dc output level is controlled with a 1000-kVA auto transformer connected to the primary of the power transformer. All elevated voltages and currents are monitored at ground potential with an optical telemetry system. This paper describes the power supply in detail, including block diagrams, component specifications, and waveforms when supplying power to an ion source. (ERA citation 05:025052)

CONF-800617-3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Experimental and Theoretical Studies of the Effects of Nonuniformities in Equilibrium MHD Generators.
M. Rosenbaum, S. E. Shamma, and J. F. Louis. 1980, 9p
Contract AC01-79ET15518
International conference on MHD electrical power generation, Cambridge, MA, USA, 16 Jun 1980, Portions of document are illegible.

An experimental study of the effects of thermal and velocity nonuniformities is performed in an equilibrium plasma for a range of Hall parameters. An electrodeless MHD disk generator with radial flow is chosen as the ideal geometry for these experiments. By introducing equally spaced cold blades in the flow, it is possible to create well defined two-dimensional wake nonuniformities with strong variations of the plasma properties in the direction normal to the magnetic field and the flow. This type of nonuniformity is predicted to provide the strongest reduction of Hall coefficient and effective conductivity for high values of Hall parameter. This degradation is controlled by both the level of nonuniformities and the value of the ideal Hall parameter. The former is dependent upon the number of blades (root mean square deviation of the conductivity), and the latter is dependent upon the values of the magnetic field intensities. The results provide basic quantitative information about the effects of conductivity and velocity nonuniformities on the performance of equilibrium MHD generators over a wide range of Hall coefficients, between 2 and 7. Reduction formulae are established between the effective and ideal Hall parameters for different levels of nonuniformities intensities. Theoretical predictions are derived from a detailed two-dimensional electrodynamic analysis and a simplified engineering model based on a generalization of Rosa's layer model. These experiments validate the analytical studies and support the use of the theoretical layer models in describing the effect of boundary layers on the performance of linear generators. (ERA citation 05:022527)

DOE/CS-0014/1 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Federal Policies to Promote the Widespread Utilization of Photovoltaic Systems. Volume I. Executive Summary Findings.
Feb 80, 97p

Contract EX-76-A-29-1012

This volume presents an introduction to the planning activities of DOE and specifies in detail DOE's approach to photovoltaic research, development, demonstration, and commercialization. Also a summary of the findings from the study mandated by Congress in section 10(c) of the Solar Photovoltaic Energy Research, Development, and Demonstration Act of 1978, Public Law 95-590 is presented. (ERA citation 05:021967)

DOE/CS-0145 PC **A13**/MF **A01**
OAO Corp., Washington, DC.
Solar Thermal Power Systems. Program Summary.
Dec 79, 283p
Contract AC01-79ET21051

This program summary describes each of the DOE's Solar Thermal Power Systems projects funded and/or in existence during FY 1979 (October 1, 1978 through September 30, 1979) and reflects their status as of September 30, 1979. The program is organized into the following areas: distributed receiver systems, central receiver systems, and advanced thermal technology. (ERA citation 05:022031)

DOE/EA-0097 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Environmental Assessment: Installation and Field Testing of a Large Experimental Wind Turbine Generator System Near Kahuka Point on the Island of Oahu, Hawaii.
Dec 79, 56p

The Department of Energy (DOE) has prepared an environmental assessment (EA) on the proposed MOD-0A wind turbine field test and evaluation near Kahuka Point on the island of Oahu, Hawaii. Based on the findings of the EA, which is available to the public on request, DOE has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA), 42 USC 4321 et seq. Therefore an environmental impact statement is not required. (ERA citation 05:022292)

DOE/ER-0049/1 PC **A03**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Some Questions and Answers About the Satellite Power System (SPS).
Jan 80, 46p
Contract AC01-79ER10041

The Office of Energy Research, US DOE is evaluating the concept of obtaining significant amounts of electrical energy from space through the Satellite Power System Project Office (SPS PO) formed for that purpose. The SPS PO prepared and is implementing a Concept Development and Evaluation Program plan. The CDEP runs roughly three years (from July 1977 through July 1980) and consists of four primary elements: (1) Systems Definition, (2) Environmental Assessment, (3) Societal Assessment, and (4) Comparative Assessment. One facet of the Societal Assessment is an investigation of public concerns. To further this investigation, a public outreach experiment was initiated to determine the initial response of three selected interest groups to the SPS, both qualitatively and quantititavely, and to gain some experience for use in future public participation activities. Three groups were contacted and agreed to participate in the experiment. They were: the Citizens Energy Project (CEP), the Forum for the Advancement of Students in Science and Technology (FASST), and the L-5 Society (L-5). They each agreed to condense twenty final SPS reports into approximately four pages each, have them typeset, printed and distributed to 3,000 of their constituents for their review, together with a request that they respond to the parent organization regarding the information presented. All responses were summarized and provided to Planning Research Corporation who then solicited the answers from the SPS PO investigator most directly concerned.The questions and answers are presented and will be distributed by the three groups to the individual respondents. Each of the three groups is also preparing a report to the Project Office detailing their work and results. These, together with other responses and studies will be used to more effectively involve the public in the SPS Participatory Technology Process. (ERA citation 05:023865)

DOE-ER-0052 PC **A02**/MF **A01**
Argonne National Lab., IL.
Selection of Alternative Central-Station Technologies for the Satellite Power System (SPS) Comparative Assessment.
M. E. Samsa. Apr 80, 19p
Contract W-31-109-ENG-38

An important effort in the Satellite Power System (SPS) Comparative Assessment is the selection and characterization of alternative technologies to be compared with the SPS concept. This report summarizes the ground rules, criteria, and screening procedure applied in the selection of those alternative technologies. The final set of central-station alternatives selected for comparison with the SPS concept includes: (1) light water reactor with improved fuel utilization, (2) conventional coal combustion with improved environmental controls, (3) open-cycle gas turbine with integral low-Btu gasifier, (4) terrestrial photovoltaic, (5) liquid metal fast breeder reactor, and (6) magnetic-confinement fusion. (ERA citation 05:023846)

DOE/ER-0054 PC **A03**/MF **A01**
Argonne National Lab., IL.
Preliminary Comparative Assessment of Land Use for the Satellite Power System (SPS) And Alternative Electric Energy Technologies.
D. E. Newsom, and T. D. Wolsko. Apr 80, 26p
Contract W-31-109-ENG-38

A preliminary comparative assessment of land use for the satellite power system (SPS), other solar technologies, and alternative electric energy technologies has been conducted. The alternative technologies are coal-gasification/combined-cycle, coal fluidized-bed combustion (FBC), light water reactor (LWR), liquid metal fast breeder reactor (LMFBR), terrestrial photovoltaics (TPV), solar thermal electric (STE), and ocean thermal energy conversion (OTEC). Fusion was not included in this preliminary work but will be a part of the final evaluation based on available research, to identify a suitable assessment methodology, and to identify data deficiencies. The major issues of a land use assessment are the quantity, purpose, duration, location, and costs of the required land use. The phased methodology described treats the first four issues, but not the costs. Several past efforts at comparative or single-technology assessment are reviewed briefly. The current state of knowledge about land use is described for each technology. Conclusions are drawn regarding deficiencies in the data on comparative land use and needs for further research. (ERA citation 05:023848)

DOE/ER-0055 PC **A05**/MF **A01**
Argonne National Lab., IL.
Comparative Assessment of Environmental Welfare Issues Associated with the Satellite Power System (SPS) And Alternative Technologies.
E. P. Levine, M. J. Senew, and R. R. Cirillo. Apr 80, 99p
Contract W-31-109-ENG-38

Environmental deterioration can affect an individual's health, safety, and welfare (examples of welfare effects include reduced crop yield, loss of property, and interference with other activities). This study identifies sources of environmental deterioration and associated welfare effects from two mature electric power generation systems (combustion of coal and light water nuclear reactors) and compares these with those expected from a conceptual satellite power system. Each activity within the energy pathway for each power system is examined to determine the potential welfare effects it imposes on a community. The severities of these effects are compared. On the basis of this comparison and the state of knowledge concerning specific environmental impacts and welfare effects, key environmental issues are identified for subsequent, in-depth analyses. (ERA citation 05:023849)

DOE/ET/15518-2 PC **A12**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Key Contributions in MHD Power Generation. Quarterly Report, 1 June 1979-31 August 1979.
J. F. Louis. Nov 79, 260p
Contract AC01-79ET15518

Activities during the third quarter of the contract period are reported in detail. The tasks reported on include: (1) investigation of electrical behavior in the vicinity of electrode and insulating walls; (2) studies of critical performance issues in the development of combustion disk generators; (3) development and testing of electrode modules, including studies of insulator properties; and (4) determination of coal combustion kinetics and ash behavior relevant to two-stage MHD combustors, and investigation of the mixing and flow aerodynamics of a high swirl geometry second stage. (ERA citation 05:022521)

DOE/ET/23010-12 PC **A03**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
Cuprous Oxide Photovoltaic Cells. Third Quarterly Technical Progress Report, October 9, 1979-January 8, 1980.
1980, 26p
Contract AC04-79ET23010

Previous work on cuprous oxide Schottky barrier photovoltaic cells showed that some potential improvements were limited by chemical degradations at the junction, e.g. in Al/Cu sub 2 O cells, the aluminum reduced the surface of the Cu sub 2 O to metallic Cu. The present project is being devoted to a study of methods to avoid this problem and also to the development of other methods of improving the efficiency of Cu sub 2 O cells. Some results on Auger studies of the oxide heterojunctions, the preparation of doped Cu sub 2 O by introduction of impurities in the starting copper, the exploration of several methods for the study of diffusion length, and some initial attempts on the laser annealing of Cu sub 2 O are reported. (ERA citation 05:023806)

DOE/ET/23010-9 PC **A03**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
Cuprous Oxide Photovoltaic Cells. Second Quarterly Technical Progress Report, July 9-October 8, 1979.
D. Trivich, and L. Papadimitriou. 1980, 32p
Contract AC04-79ET23010

Research on the fabrication and characteristics of solar cells based on heterojunctions of Cu sub 2 O with SnO sub 2 , In sub 2 O sub 3 , CdO, and mixtures of CdO and SnO sub 2 is described. The Cu sub 2 O samples were prepared by thermal oxidation of copper sheet and the other semiconductors were applied by ion sputtering. Current-voltage characteristics of the heterojunctions, Auger spectra of the top surfaces, and Auger depth profiles are presented graphically. (ERA citation 05:021970)

DOE/ET/23045-1 PC **A03**/MF **A01**
Rockwell International, Anaheim, CA. Electronic Devices Div.
Chemical Vapor Deposition of Thin-Film Polycrystalline Si for Low-Cost Solar Cells. First Quarterly Technical Progress Report, July 23, 1979-November 2, 1979.
R. P. Ruth, W. I. Simpson, L. A. Moudy, and J. J. Yang. Nov 79, 35p
Contract AC03-79ET23045

A research program is being conducted for the purpose of developing thin-film polycrystalline Si solar cells on low-cost substrate materials, using chemical vapor deposition (DVC) techniques to prepare the films and vapor-growth doping, thermal diffusion, or ion implantation to produce the required p-n junctions. The results of the first quarter of work are summarized. An existing Si CVD reactor system is being used for the investigations, and its design features are discussed. System background doping concentrations and Si film growth-rate uniformity were determined, and general film quality typical of the system and the reactants in use was established - including the properties of Si-on-saphire films prepared during the course of the initial investigations. These results are described in detail. A working curve for growth of boron-doped p-type Si films (using diborane-in-He as the source) has been established for film growth at approx. 1000 exp 0 C, covering the con-

centration range 1 x 10 exp 16 to 3 x 10 exp 19 cm exp -3 . Similar data for lower-temperature growth are also being obtained. Planned activities for the next quarter are outlined. (ERA citation 05:023808)

DOE/ET/23056-1 PC **A08**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
System Design of a Photovoltaic Flat-Panel Applications Experiment at Busch Gardens, Tampa, Florida. Final Report.
Mar 80, 160p
Contract AC04-78ET23056

The detailed system design for a photovoltaic roof shingle module installation at Busch Gardens, Tampa, FL, (also known as the Dark Continent) is discussed. This installation of 4312 shingle solar cell modules of a second-generation design, which was developed under this contract, produces 29.5 kW of peak output at 237 Vdc under Standard Operating Conditions (SOC) with an NOCT at 61 exp 0 C. With a total gross roof area of 330.7 m exp 2 , this installation yields an areal specific power output of 89.2 watt/m exp 2 at SOC. The system which uses an improved, low loss direct-coupled, line-commutated inverter controlled to operate the solar array maximum power operating point, delivers 208Y/120 volt, 3 phase ac in parallel with the Busch Gardens distribution network. The calculated annual ac energy m exp 2 . The resulting overall system conversion efficiency of 9.2% is considered high for a system using large area circular solar cells. (ERA citation 05:022021)

DOE/ET/29187-T3 PC **A07**/MF **A01**
Franklin Inst. Research Labs., Philadelphia, PA.
Description of the System Planning Process at Florida Power Corporation. Task I. Report No. FC-5237-1.
Jan 80, 143p
Contract AC02-79ET29187

One of the means of evaluating a new technology is to have it considered by a utility company, run through the system planning, and thus scrutinized by a potential user of the new technology in a manner directly drawn from the user's methods of decision making on new capacity additions. By having Florida Power Corporation (FPC), a company with real potential for the future use of ocean thermal energy conversion (OTEC), exercise its system planning methods to consider this possible source of future generating capacity, a number of highly useful results will be obtained. The overall study of the application of system planning to OTEC is being carried out in four tasks. This report covers task-1 which provides a description of the existing system and the planning process of Florida Power Corporation. (ERA citation 05:023867)

DOE/EV/04651-T1 PC **A03**/MF **A01**
Montana Energy and MHD Research and Development Inst., Inc., Butte.
Environmental Readiness Document Magnetohydrodynamics.
Jul 79, 44p
Contract EP-78-C-02-4651

The major areas of environmental concern with regard to the commercialization of coal-fired MHD generators are discussed. MHD technology and expectations about its future utilization are described. Information pertinent to the technology was drawn from the DOE technology program office and from an Environmental Development Plan developed for the technology by EV and the program office through an Environmental Coordination Committee. The environmental concerns associated with the technology are examined, and the current status of knowledge about each concern and its potential seriousness and manageability through regulation and control technology, is discussed. Present and projected societal capabilities to reduce and control undesirable environmental, health, safety, and related social impacts to a level of public acceptability -- as reflected in current and proposed environmental standards -- which will allow the technology to be commercialized and utilized in a timely manner are summarized. The ERD as a whole thus provides an assessment, within the limits of available knowledge and remaining uncertainties, of the future environmental readiness of the technology to contribute to the meeting of the Nation's energy needs. (ERA citation 05:024214)

DOE/JPL-1060-31 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Point-Focusing Thermal and Electric Applications Project. Annual Technical Report, Fiscal Year 1979. Volume I. Executive Summary. JPL Publication 79-118, Volume I.
15 Jan 80, 36p
Contract EX-77-A-29-1060

This is a summary of the Point-Focusing Thermal and Electric Applications PFTEA Project's Annual Technical Report for FY 1979. More detailed compilation of results for this year may be found in Volume II. Major activities in FY 1979 centered around the definition and implementation of the engineering experiments that form the main thrust of the PFTEA Project. Phase I of the first experiment, the Small Community Solar Thermal Power Experiment, was completed. As a result of the Phase I concept definition studies that included a small central receiver approach, a point-focusing distributed receiver system with central power generation and a point-focusing distributed receiver concept with distributed power generation, Ford Aerospace and Communications Corporation was selected to pursue the last approach in Phase II. The first experiment in the Isolated Application Series was initiated as a result of procurement activities that culminated with the release of an RFP for the Military Module Power Experiment. A 100 kWe power plant based on Hybrid Brayton technology is being developed in conjunction with the US Navy. Planning for the third engineering experiment series, which addresses the industrial market sector, was initiated in FY 1979. In addition to the experiment-related activities, several contracts to industry were let and studies at JPL were conducted to explore the market potential for Point-Focusing Distributed Receiver (PFDR) Systems. System analysis studies were completed that looked at PFDR technology relative to other small power system technology candidates for the utility market sector. (ERA citation 05:023859)

DOE/JPL/954331-80/9 PC **A13**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Silicon Materials Task of the Low Cost Solar Array Project (Phase III). Effect of Impurities and Processing on Silicon Solar Cells. Phase III Summary and Seventeenth Quarterly Report, Volume 1: Characterization Methods for Impurities in Silicon and Impurity Effects Data Base.
R. H. Hopkins, J. R. Davis, A. Rohatgi, R. B. Campbell, and P. D. Blais. Jan 80, 295p
Contract NAS-7-100-954331

The object of Phase III of the program has been to investigate the effects of various processes, metal contaminants and contaminant-process interactions on the performance of terrestrial silicon solar cells. The study encompassed a variety of tasks including: (1) a detailed examination of thermal processing effects, such as HCl and POCl sub 3 gettering on impurity behavior, (2) completion of the data base and modeling for impurities in n-base silicon, (3) extension of the data base on p-type material to include elements likely to be introduced during the production, refining, or crystal growth of silicon, (4) effects on cell performance on anisotropic impurity distributions in large CZ crystals and silicon webs, and (5) a preliminary assessment of the permanence of the impurity effects. Two major topics are treated: methods to measure and evaluate impurity effects in silicon and comprehensive tabulations of data derived during the study. For example, discussions of deep level spectroscopy, detailed dark I-V measurements, recombination lifetime determination, scanned laser photo-response, and conventional solar cell I-V techniques, as well as descriptions of silicon chemical analysis are included. Considerable data are tabulated on the composition, electrical, and solar cell characteristics of impurity-doped silicon. (ERA citation 05:023809)

DOE/JPL/954356-80/12
PC **A03**/MF **A01**
Honeywell Corporate Material Sciences Center, Bloomington, MN.
Silicon-on Ceramic Process: Silicon Sheet Growth and Device Development for the Large-Area Silicon Sheet Task of the Low-Cost Solar Array Project. Quarterly Report No. 14, January 1-March 31, 1980.
A. B. Whitehead, J. D. Zook, B. L. Grung, K. McHenry, and S. B. Schuldt. 21 Apr 80, 40p
Contract NAS-7-100-954356

The purpose of this research program is to investigate the technical and economic feasibility of producing solar-cell-quality sheet silicon by coating inexpensive ceramic substrates with a thin layer of polycrystalline silicon. The coating methods to be developed are directed toward a minimum-cost process for producing solar cells with a terrestrial conversion efficiency of 11% or greater. By applying a graphite coating to one face of a ceramic substrate, molten silicon can be made to wet only that graphite-coated face and produce uniform, thin layers of large-grain polycrystalline silicon; thus, only a minimal quantity of silicon is consumed. A dip-coating method for putting silicon on ceramic (SOC) has been shown to produce solar-cell-quality sheet silicon. This method and a continuous-coating process also being investigated have excellent scale-up potential which offers an outstanding, cost-effective way to manufacture large-area solar cells. The dip-coating investigation has shown that, as the substrate is pulled from the molten silicon, crystallization continues to occur from previously grown silicon. Therefore, as the substrate length is increased (as would be the case in a scaled-up process), the expectancy for larger crystallites increases. Results and accomplishments are reported. (ERA citation 05:021976)

DOE/JPL/954853-80/9 PC **A02**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
Investigation of Proposed Process Sequence for the Array Automated Assembly Task. Phase II. Quarterly Technical Progress Report, March 28, 1980.
A. Garcia, S. Bunyan, and B. Wong. Apr 80, 22p
Contract NAS-7-100-954853

Evaluation of infrared drying (at approximately 300 exp 0 C) PX-10 diffusion source in about one minute or less, revealed comparable results to the conventional oven drying at 150 exp 0 C for 15 minutes. Initially investigation of the fritted-nickel paste front contact indicated high series resistance. Series resistance was reduced upon solder dipping. Further experimentation on junction isolation by laser scribing the front edge of finished, non-AR coated, solar cells continued this period. All scribing was done in the TEM sub 00 laser mode. Non-AR coated cell efficiency as high as 10.4% was achieved at a laser output level of 7 watts/cm exp 2 and a Q-factor of 3000 pulse/inches. This performance was equivalent to non-AR coated control cells processed by back side scribing and breaking. Further evaluation of the titanium-isopropoxide base spray-on AR solution applied with the Advanced Concepts spray system located at Sensor Texturizing, Inc., revealed no new results. System is still plagued with problems that interfere with the atomization of the source. A new lamination lay-up procedure has been successfully demonstrated using Crane-Glas to prevent gas entrapment and aluminum foil as a vapor barrier. (ERA citation 05:023811)

DOE/JPL/955089-80/6 MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Silicon Solar Cell Process Development, Fabrication and Analysis. Fifth Quarterly Report, October 1, 1979-December 31, 1979.
H. I. Yoo, P. A. Iles, and F. F. Ho. 1979, 76p
Contract NAS-7-100-955089
Microfiche copies only.

This program investigates, develops and utilizes technologies appropriate and necessary for improving the efficiency of solar cells made from various unconventional silicon sheet materials. During this reporting period, work has progressed in fabrication and characterization of solar cells from EFG (RH) multi-ribbon, dendritic webs and cast silicon by HEM. Solar cells were fabricated using various process modifications, such as shallow junction formation, BSF, back surface reflector (BSR), surface etching and texturizing, gettering by mechanical damage and diffusion glass and grain boundary passivation. The solar cell parameters measured included open circuit voltage, short circuit current, curve fill factor, and conversion efficiency (all taken under AMO illumination). Additional measurements under AM1 conditions have been included, for direct evaluation and to collect information on the AM1/AM0 conversion factors for the

various sheet materials. Also, measurement for typical cells included spectral response and minority carrier diffusion length. The obtained results were compared to the properties of cells made from conventional single crystalline Czochralski silicon with an emphasis on statistical-evaluation. Increased emphasis was given toward modifying the process to yield increased performance. (ERA citation 05:023813)

DOE/JPL/955491-80/2 PC **A02**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of Processes for the Production of Solar Grade Silicon from Halides and Alkali Metals. Second Quarterly Report, 1 January-31 March 1980.
C. R. Dickson, and R. K. Gould. Apr 80, 23p
AeroChem-TN-212
Contract NAS-7-100-955491

This program is directed toward the development of processes involving high temperature reactions of silicon halides with alkali metals for the production of solar grade silicon in volume at low cost. Experiments are being performed to evaluate product separation and collection processes, measure heat release parameters for scaling purposes, determine the effects of reactants and/or products on materials of reactor construction, and make preliminary engineering and economic analyses of a scaled-up process. Samples of the silicon product will be delivered to JPL for evaluation of solar cell performance. During this reporting period, the program efforts were directed toward the measurement of reagent flow rates and silicon collection efficiencies, the construction of a new sodium heat pipe to permit one to two hour runs, and the completion of the economic and engineering analyses of the AeroChem process to make solar grade silicon. Progress is reported. (ERA citation 05:021988)

DOE/JPL/955533-79/1 PC **A04**/MF **A01**
Hemlock Semiconductor Corp., MI.
Development of a Polysilicon Process Based on Chemical Vapor Deposition (Phase 1). First Quarterly Progress Report, 6 October-31 December 1979.
J. R. McCormick, A. Arvidson, F. Plahutnik, D. Sawyer, and K. Sharp. Jan 80, 65p
Contract NAS-7-100-955533

The goal of this program is to demonstrate that a dichlorosilane based reductive chemical vapor deposition (CVD) process is capable of producing, at low cost, high quality polycrystalline silicon. Physical form and purity of this material will be consistent with LSA material requirements for use in the manufacture of high efficiency solar cells. Chemical processes involved in achieving the objective are reviewed with emphasis placed on advantages of this process when compared with existing polycrystalline silicon production technology. Installation of a CVD reactor with associated analytical instrumentation is described. Preliminary reactor data has been favorable demonstrating the anticipated increased deposition rate and conversion efficiency when dichlorosilane decomposition is compared with trichlorosilane decomposition. No serious problems have been encountered which might limit dichlorosilane use as a reactor feed material. Design considerations for a process development unit (PDU) for dichlorosilane synthesis are reviewed. A design which effectively suppresses monochlorosilane during the redistribution of trichlorosilane was decided upon and its implementation is described. The PDU will be used to collect data on optimization of the redistribution process as well as to determine product quality. Based on experimental data collected during the first quarter along with already available data on the redistribution and hydrogenation processes, a preliminary mass balance is established. (ERA citation 05:023815)

DOE/NASA/0026-79/1 PC **A03**/MF **A01**
Paragon Pacific, Inc., El Segundo, CA.
Wind Energy System Time-Domain (WEST) Analyzers Using Hybrid Simulation Techniques.
J. A. Hoffman. Oct 78, 30p NASA-CR-159737, PPI-1030-6
Contract EX-76-A-29-1028

A qualitative description of each element of the WEST analyzers is presented. Uses for the analyzers in examining wind energy system operation in the random wind environment are identified. The results of limited correlation efforts are presented, which show good performance of the WEST units when compared to alternative analytical methods. A description of the WEST verification procedure is also included. (ERA citation 05:024004)

DOE/NASA/0058-79/1 MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Mod 1 Wind Turbine Generator Failure Modes and Effects Analysis.
Feb 79, 99p NASA-CR-159494
Contract EX-76-A-29-1010
Microfiche copies only.

A failures modes and effects analysis (FMEA) was performed for the Mod 1 Wind Turbine Generator. The analysis was directed primarily at identifying those critical failure modes that would be hazardous to life or would result in major damage to the system. Each subsystem was approached from the top down, and broken down to successive lower levels where it appeared that the criticality of the failure mode warranted more detail analysis. The results were reviewed by knowlegeable specialists from outside the Mod 1 program, and corrective action taken whenever recommended. (ERA citation 05:022296)

DOE/NASA/0058-79/3 PC **A04**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Mod 1 Wind Turbine Generator Analysis and Design Report: Executive Summary.
May 79, 61p NASA-CR-159497
Contract EX-76-A-29-1010

The Mod 1 program is being conducted in six phases: analysis and preliminary design (culminating in a preliminary design review), detail design (ending with a final design review), fabrication and assembly, system testing, site preparation, and installation and checkout. Major milestone dates for these phases are shown. This report is intended to describe only the results of the first two phases; that is, activities leading to the completion of detail design. Although this report places emphasis on a description of the design as it finally evolved, it also traces the steps through which the design progressed in order to understand the major design decisions. (ERA citation 05:022297)

DOE/NASA/0063-79/1 PC **A03**/MF **A01**
Carter (Jay) Enterprises, Burkburnett, TX.
Steam Ranking Reciprocator System. 15 KWe (Nominal) Solar Thermal-Electric Power Conversion Concept Definition Study.
W. Wingenbach, and J. Carter, Jr. Jun 79, 45p
NASA-CR-159591
Contract EX-77-A-29-1060

A study was undertaken to define a concept of a nominal 15 kWe steam Rankine power conversion subsystem for a point focusing distributed solar thermal-electric system. A mathematical model of the Jay Carter Enterprises steam engine concept was developed in order to conduct a parametric analysis covering a broad range of steam inlet pressure and temperature as well as variations in engine configurations and condensing temperature. As a result of the parametric study, a design point at 677 exp 0 C (1250 exp 0 F) and 17.2 x 10 exp 6 N/m exp 2 (2500 psi) was selected as maximum inlet steam temperature and pressure with a maximum solar thermal power of 80 kW. Conceptual designs were developed for a simple cycle and a compound reheat cycle engine concept. The simple cycle concept employs a single cylinder simple cycle uniflow expander. The reheat concept employs a 3600 rpm, compound- reheat cycle reciprocating expander containing a single high pressure cylinder and a single low pressure cylinder with the steam being reheated to the maximum inlet temperature after expansion by the high pressure cylinder. Both expanders have counter-rotating counter-balance shafts to perfectly balance the expander and eliminate vibration. Except for the difference in expanders the two concepts are identical. Power generation is accomplished with a three-phase induction motor directly coupled to the expander and connected electrically to the public utility power grid. It is concluded that the reheat cycle concept has a maximum heat engine efficiency of 33 percent and a maximum power conversion efficiency of 30 percent as compared to the simple cycle efficiencies of 28 percent and 26 percent. (ERA citation 05:022044)

DOE/NASA/2674-80/10 PC **A02**/MF **A01**
Linde A.G., Munich (Germany, F.R.).
Optimization of Air Separation Plants for Combined Cycle MHD-Power Plant Applications.
H. Springmann, R. Greenberg, and A. J. Juhasz. 1980, 15p NASA-TM-81510, CONF-800617-1
Contract EF-77-A-01-2674
International conference on MHD electrical power generation, Cambridge, MA, USA, 16 Jun 1980.

Some of the design approaches being employed during a current DOE/NASA supported study directed at developing an improved air separation process for the production of oxygen enriched air for MHD combustion are described. The ultimate objective of the study is to arrive at conceptual designs of air separation plants, optimized for minimum specific power consumption and capital investment costs, for integration with MHD combined cycle power plants. Final results will be published following completion of contract in mid-1980. (ERA citation 05:024222)

DOE/NE-0006 PC **A13**/MF **A01**
Department of Energy, Washington, DC.
Fission Energy Program of the US Department of Energy, FY 1981.
Mar 80, 276p

Information is presented concerning the National Energy Plan and fission energy policy; fission energy program management; converter reactor systems; breeder reactor systems; and special nuclear evaluations and systems. (ERA citation 05:022378)

DOE/RA/10001-T1 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Resource Applications.
Analysis of Environmental Factors Affecting Technology Deployment: A Case Study.
C. D. Meyers, and E. H. Pechan. 1979, 69p

A study was conducted for the Office of Resource Applications, US Department of Energy (DOE), to assess the potential market and possible market penetration of four electric baseload generating technologies employing coal combustion, in three selected geographic areas of the US, within the time frame between the present and the year 1998. The major focus was on quantification of environmental performance of these technologies and relation of environmental performance to environmental constraints identified in the study area. The technologies under consideration were all coal-fired electric generation of the following types: conventional steam-electric generation with flue gas scrubbers for desulfurization (the baseline technology); steam-electric generation utilizing atmospheric fluidized bed combustion (AFBC); steam-electric generation utilizing pressurized fluidized bed combustion (PFBC); and electric generation utilizing combined cycle turbines (CC). Three geographic areas corresponding to utility power pools were selected for study: peninsular Florida, a southern region (most of the states of Alabama, Georgia, and Mississippi), and part of the state of Texas. A summary of findings and conclusions is presented. In Chapter 2, the analytic approach is presented; in Chapter 3, the technology specific environmental factors are presented; in Chapter 4, information on the growth in generation is presented; and in Chapter 5, the environmental implications of deployment of the new technologies is explored. (ERA citation 05:024027)

DSE-4042-T17 PC **A03**/MF **A01**
Globe-Union, Inc., Milwaukee, WI.
Commercializatzon of Thick Film Solar Cells. Quarterly Progress Report, September 21, 1979-December 31, 1979.
G. D. McDonald, and G. Goodman. 1979, 31p
Contract EG-77-C-01-4042

Starting materials for the preparation of thick film cadmium sulfide and cadmium telluride solar cells have been comminuted. Initial trial films of cadmium sulfide showed that during the next phase of this work, the printing of films, one of the major problem areas will be to obtain sufficient reflow in the printed films to remove the screen-caused vari-

ation in film thickness. The thin areas corresponding to the screen pattern caused pinholes to form in the fired parts. (ERA citation 05:023817)

EPRI-ER-1299-SR MF **A01**
Electric Power Research Inst., Palo Alto, CA.
Electric Utility Solar Energy Activities: 1979 Survey.
R. Furness. Dec 79, 217p
Microfiche copies only.

The results of a survey to determine the scope of solar energy projects sponsored by electric utilities in the United States are presented. It contains brief descriptions of 735 projects being conducted by 180 utility companies. Also included are an index of projects by category, a statistical summary, a list of participating utilities with information contacts and addresses, a list of utilities with projects designated by category, a list of utilities organized by state, and a list of available reports on utility-sponsored projects. (ERA citation 05:020253)

EPRI-FR-1251 MF **A01**
Radian Corp., Austin, TX.
Summary of Equilibrium and Process Model Data Acquisition: Treatment of Recirculated Cooling Water, Resource Document 1.
W. C. Micheletti, and M. L. Owen. Dec 79, 74p
Microfiche copies only.

The results of a comprehensive literature data acquisition effort focusing on all aspects of cooling water chemistry are presented. During this search, special emphasis was given to four subject areas: (1) silica species, (2) phosphate species, (3) softening operations, and (4) chemical cooling water treatments. The data documented in this report are meant to serve three specific purposes: (1) to support development efforts for a computer program capable of describing closed loop recirculating cooling systems, (2) to support the development of an effective field test program for a portable test facility, and (3) to support the development of a laboratory test plan for determining chemical and operational data not found in the literature. While this report is not intended to be a complete source of information on cooling tower operation and associated water chemistry, it is published with the intent that it may serve as a useful resource reference document for members of the electric utility industry concerned with cooling tower operation. (ERA citation 05:022338)

EPRI-P-1309-SR PC **A23**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
1980-1984 Research and Development Program Plan: Program Descriptions.
Feb 80, 540p

One of three planning documents published annually by the Electric Power Research Institute, this 1980-1984 R and D Program Plan presents a description of the EPRI research program and reviews the major objectives to be accomplished within the five-year planning period. The plan focuses on near-term evolutionary improvements of current technologies and on the development of next-generation options. Major emphasis is placed on electricity supply and conservation; cost-effective alternatives; health and environmental implications; coal and nuclear systems; and energy storage-systems. The document describes 35 programs and explains the importance of each to the utility industry. The programs are organized in six technical divisions: Coal Combustion Systems, Advanced Power Systems, Energy Management and Utilization, Nuclear Power, Electrical Systems, and Energy Analysis and Environment. A separate abstract was prepared for each section reporting the activities of a particular division. (ERA citation 05:022327)

EPRI-P-1310-SR PC **A16**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
1980 Research and Development Program Plan.
Feb 80, 362p

The 1980 Research and Development Program Plan is one of three planning documents published annually by the Electric Power Research Institute. This edition summarizes program objectives, lists key events, and shows projects that will comprise the 1980 work. Thirty-five programs are reviewed, organized in accordance with the Institute's technical divisions: Coal Combustion Systems, Advanced Power Systems, Energy Management and Utilization, Nuclear Power, Electrical Systems, and Energy Analysis and Environment. Each program is subdivided into three categories: existing projects that will continue in 1980; new projects planned for 1980; and future projects under consideration. Funding is summarized in the Introduction, then analyzed in the main body of the report by division, program, and project. See also EPRI-P--1309-SR, which outlines the program plan for 1980-1984; a separate abstract was prepared for each of the separate divisions as they reported. (ERA citation 05:022335)

FE-15529-5 PC **A06**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
MHD Electrode Development. Quarterly Report, October-December 30, 1979.
J. W. Sadler, L. H. Cadoff, and J. Bein. Feb 80, 119p
Contract AC01-79ET15529

Platinum capped anodes and iron cathodes will be evaluated in a future WESTF test, WESTF Test 43. Results of bonding studies in support of this test are presented. In addition, an attachment technique has been developed for bonding the iridium-doped hafnia current leadout material to a compliant nickel mesh and results are reported. Laboratory electrochemical corrosion tests have continued. Results reported indicate that major reductions in polarization, electrical resistivity and ionic transference number of the slag (Rosebud) can be achieved with moderate additions of cobalt which will produce a significant reduction in the electrochemical stress. Significant WESTF operations included WESTF D-10 (2 runs), WESTF D-11 and WESTF Test 45. This latter test was the first WESTF screening test of candidate electrode materials for use in the non-slagging, super-hot, operating mode. Results of design and fabrication activities supportive of the upcoming WESTF tests are presented. Status of design, procurement and modification activities in support of the installation of a conventional 3 tesla magnet in WESTF is presented. Facility shutdown to permit installation of the magnet is projected for March 1980. (ERA citation 05:022526)

FE-1806-79 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Gas Turbine Div.
Development of High Temperature Turbine Subsystem Technology to a Technology Readiness Status, Phase II. Progress Report, December 1979.
10 Jan 80, 38p
Contract EX-76-C-01-1806

Fabrication of the hot gas path development test stand is completed. The mixing chamber and the three combustion chambers were delivered to Schenectady this month. Installation of the test stand into the facility has been initiated. Successful casting for the second stage nozzle, to be tested in the HGPDTS, have been made. Ultrasonic nondestructive evaluation of the composite water-cooled nozzle, which was tested during the recently completed integrated gasifier-turbine simulator test, has been completed. No unbonding of the composite materials was detected. A plan for sectioning the nozzle for further evaluation is being prepared. Heat transfer testing on the flat plate specimen in the shock tunnel is continuing. A topical report summarizing the low temperature, low Btu gas, chemical cleanup system task effort was prepared and released in complete fulfillment of contract requirements. Testing of radial cooling passages in the motorized rig continues. This month the effects of channel tilt, rotational speed, and channel diameter on the heat transfer performance of the passage were evaluated. Results continue to validate the design adequacy of this bucket cooling approach. Fired stability testing of the combustor fuel nozzle on test fuel (propane/steam) in the atmospheric test stand was completed this month. All configurations tested demonstrated adequate flame stability. Detailed status of the combustor development is reported. Also reported is the status of the materials and processes tasks and the mechanics of materials tasks in support of high temperature turbine technology. (ERA citation 05:022347)

FE-2238-T1 PC **A21**/MF **A01**
General Electric Co., Philadelphia, PA. Space Sciences Lab.
Evaluation of Technical Feasibility of Closed Cycle Non-Equilibrium MHD Power Generation with Direct Coal Firing. Final Report, April 1, 1976-March 31, 1979.
C. S. Cook, C. H. Marston, and T. Dellinger. 1979, 484p
Contract EX-76-C-01-2238

Coal-fired, closed cycle MHD power generation offers the potential of achieving plant efficiencies approaching 50% versus current new conventional steam plants which have efficiencies in the range of 30 to 35%. The activities of the General Electric Space Sciences Laboratory in support of the national CCMHD program are described. The contract was composed of the four distinct task elements. Task I consisted of the assessment of the contamination of an argon gas working fluid heated to 2800 F by a ceramic regenerative heat exchanger. Task II involved the conversion of the heat exchanger test facility to a direct coal-fired configuration. An advanced, high slag rejection, cyclone type combustor was designed, fabricated and integrated into the heat exchanger test facility. Task III provided analytical and computational support for the program. The three primary areas of analytical support included: (1) Design and diagnostic data analysis for the regenerative heat exchanger test program as well as some of the fluid mechanical and combustion analysis required for the coal combustor. (2) Non-equilibrium MHD generator performance analysis with emphasis on modeling the effects of contaminant carryover as well as nonsteady flow phenomena. (3) System analysis for a conceptual MHD power plant including integration of the topping cycle with the steam bottoming plant. Task IV was added midway through the contract and was designed to support the development of a novel General Electric Flex Bed electrode. Results are reported in detail. (ERA citatio.. 05:022522)

FE-2248-23 MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
Joint US-USSR Test of the US MHD Electrode System in the U-02 Facility, Phase III. Final Report.
Jun 79, 362p
Contract EX-76-C-01-2248
Microfiche copies only.

The U-02 Phase III Module, which incorporated lanthanum chromite based electrodes, MgO and MgAl sub 2 O sub 4 interelectrode insulators, and used a BRUNSBOND/sup R/ nickel mesh as the attachment current lead-out material, was operated at temperature for a period of 132 hours, of which 107 hours were under full MHD conditions. This is the final definitive document concerning the joint Phase III U-02 MHD test carried out in Moscow between May 13 and May 19, 1978. The design of the electrode modules including anode and cathode walls is given, and pre-test materials data are given in detail. Data relating to the experimental conditions during the test are detailed, and module performance data are presented. Procedures and results of post-test materials characterization studies are presented. (ERA citation 05:024221)

FE-2291-36A PC **A06**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
High Temperature Turbine Technology Program. Phase II. Technology Test and Support Studies. Technical Progress Report, July 1, 1978-September 30, 1978.
Oct 78, 111p CW-WR-76-020-36A
Contract EX-76-C-01-2291

Work performed on the High Temperature Turbine Technology Program, Phase II - technology test and support studies during the period from July 1, 1978 through September 30, 1978 is summarized. Objectives of the program elements as well as technical progress and problems during this fourth Phase II reporting period are presented. Planned progress during the next reporting period is also

defined. Progress on design, fabrication, and checkout of test facilities and test rigs is described. Cascade testing of turbine vanes was conducted in a particulate-laden 3400 exp 0 F (max.) gas stream. Analytical predictions of LP engine performance are discussed. Preparation and early testing of specimens for materials testing is reviewed. (ERA citation 05:022348)

FERC/EIS-0012 PC **A09**/MF **A01**
Federal Energy Regulatory Commission, Washington, DC. Office of Electric Power Regulation.
Swan Lake Project No. 2911, Alaska. Final Environmental Impact Statement.
Apr 80, 189p

Ketchikan Public Utilities (Applicant) is proposing to construct a 22 MW hydroelectric project on Falls Creek and Swan Lake near Ketchikan, Alaska. This action would require construction of a 174-foot-high dam on Falls Creek thereby enlarging Swan Lake to about 1500 acres; construction of a 2200-foot-long power tunnel leading to a powerhouse at tidewater; construction of a 30.5-mile-long 115-kV transmission line; and construction of a port facility and access roads to the powerhouse and dam. Construction would commence in 1980, and be completed in 1983. The environmental impacts of this project and its economics in comparison with alternative forms of power generation are examined. (ERA citation 05:021943)

INKA-Conf-79-378-046 MF **A01**
European Space Research and Technology Centre, Noordwijk (Netherlands).
European Technology Applicable to Solar Power Satellite Systems (SPS).
H. Stoewer, B. Tilgner, and D. Kassing. 1979, 23p CONF-7909124-1, IAF-79-174
30. congress of the International Astronautical Federation, Munich, F.R. Germany, 16 Sep 1979. U.S. Sales Only. Microfiche copies only.

The Solar Power Satellite System (SPS) stands for a concept which is intended to collect energy in Earth orbit, transmit it to the Earth and convert it on the ground into electric energy. This paper summarizes European space technology activities that might have potential for application in a possible future Solar Power Satellite System (SPS) program. Before a decision in favor of or against an SPS development program can be made, several critical technology areas must be investigated in order to assess with a reasonable degree of confidence the potential benefits, cost and development risks associated with an SPS. Existing and developing European space technologies are compared with the expected requirements of a study assessment and early key technology verification investigations for the SPS concept. It is shown that a number of existing European space technologies and the results of current development efforts apply well to this. However very substantial advances in almost all technological areas will be necessary before a prudent decision for implementation of an SPS can be made. (ERA citation 05:022023)

N80-26399/9 PC **A05**/MF **A01**
Oregon Graduate Center for Study and Research, Beaverton.
Fabrication and Surface Characterization of Composite Refractory Compounds Suitable for Thermionic Converters.
Annual Report, 1 Aug. 1978 - 31 Jul. 1979.
P. R. Davis, and L. W. Swanson. Dec 79, 81p NASA-CR-163040, JPL-9950-356
Contracts NAS7-100, JPL-955156

The techniques of fabricating and characterizing the surface properties of electrode materials were investigated. The basic surface properties of these materials were studied with respect to their utilization as thermionic energy converter electrodes. Emphasis was placed on those factors (e.g, cesium disorption kinetic and mechanisms of low work function production) which are of primary concern to thermionic converter performance.

N80-26767/7 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Characterization of Solar Cells for Space Applications. Volume 13: Electrical Characteristics of Hughes LPE Gallium Arsenide Solar Cells as a Function of Intensity and Temperature.
B. E. Anspaugh, D. M. Beckert, R. G. Downing, T. F. Miyahira, and R. S. Weiss. 1 Jun 80, 40p NASA-CR-163025, JPL-PUB-78-15-V-13
Contract NAS7-100

Electrical characteristics of Hughes Liquid phase epitaxy, P/N gallium aluminum arsenide solar cells are presented in graphical and tabular format as a function of solar illumination intensity and temperature.

N80-26768/5 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Photovoltaic Residential Applications Program Implementation Workshop Proceedings.
R. H. Barbieri. 15 May 80, 166p NASA-CR-163274, JPL-PUB-80-22
Contracts NAS7-100, EX-76-A-29-1012
Workshop Held at Calif. Inst. Of Tech., Pasadena, 12-13 Feb. 1980.

Two major aspects of the workshop are presented: (1) presentations on the Photovoltaic program and the National Solar Heating and Cooling Demonstration program, and (2) discussions on the issues pertinent to the Residential Application program.

N80-26769/3 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA. Solar Thermal Power Systems Project.
Cost and Price Estimate of Brayton and Stirling Engines in Selected Production Volumes.
H. R. Fortgang, and H. F. Mayers. 31 May 80, 16p NASA-CR-163265, DOE/JPL-1060/35
Contracts NAS7-100, DE-AI01-79ET-20397

The methods used to determine the production costs and required selling price of Brayton and Stirling engines modified for use in solar power conversion units are presented. Each engine part, component and assembly was examined and evaluated to determine the costs of its material and the method of manufacture based on specific annual production volumes. Cost estimates are presented for both the Stirling and Brayton engines in annual production volumes of 1,000, 25,000, 100,000 and 400,000. At annual production volumes above 50,000 units, the costs of both engines are similar, although the Stirling engine costs are somewhat lower. It is concluded that modifications to both the Brayton and Stirling engine designs could reduce the estimated costs.

N80-26770/1 PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Thermal Power Systems (TPS); Point-Focusing Thermal and Electric Applications (PFTEA). Volume 2: Detailed Report, Fiscal Year 1979.
15 Jan 80, 146p NASA-CR-163023, DOE/JPL-1060/31-V-2
Contracts NAS7-100, DE-AI01-79ET-20397

Progress in the development of systems which employ point focusing distributed receiver technology is reported. Emphasis is placed on the first engineering experiment, the Small Community Solar Thermal Power Experiment. Procurement activities for the Military Module Power Experiment the first of a series of experiments planned as part of the Isolated Load Series are included.

N80-26773/5 PC **A21**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Low-Cost Solar Array Project and Proceedings of the 14TH Project Integration Meeting.
Progress Report, Aug. - Dec. 1979.
R. R. Mcdonald. 3 Apr 80, 479p NASA-CR-163263, DOE/JPL-1012/42
Contracts NAS7-100, EX-76-A-29-1012
Meeting Held 5-6 Dec. 1979.

Activities are reported on the following areas: project analysis and integration; technology development in silicon material, large area sheet silicon, and encapsulation; production process and equipment development; and engineering and operations, and the steps taken to integrate these efforts. Visual materials presented at the project Integration Meeting are included.

N80-26775/0 PC **A12**/MF **A01**
Boeing Engineering and Construction, Seattle, WA.
MOD-2 Wind Turbine System Concept and Preliminary Design Report. Volume 2: Detailed Report.
Jul 79, 269p NASA-CR-159609, DOE/NASA-0002-80/2
Contracts DEN3-2, DE-A101-793T-20305

The configuration development of the MOD-2 wind turbine system (WTS) is documented. The MOD-2 WTS project is a continuation of DOE programs to develop and achieve early commercialization of wind energy. The MOD-2 is design optimized for commercial production rates which, in multiunit installations, will be integrated into a utility power grid and achieve a cost of electricity at less than four cents per kilowatt hour.

N80-26776/8 PC **A06**/MF **A01**
General Electric Co., Philadelphia, PA.
Design, Fabrication, Test, and Qualification and Price Analysis of Third Generation Design Solar Cell Modules.
N. F. Shepard. 31 Mar 80, 113p NASA-CR-163028, DOE/JPL-955401-80/1
Contract JPL-955401

The Block 4 shingle type module makes it possible to apply a photovoltaic array to the sloping roof of a residential building by simply nailing the overlapping hexagon shaped shingles to the plywood roof sheathing. This third-generation shingle module design consists of nineteen series connected 100 mm diameter solar cells which are arranged in a closely packed hexagon configuration to provide in excess of 75 watts/sq m of exposed module area under standard operating conditions. The solar cells are individually bonded to the embossed underside of a 4.4 mm thick thermally tempered piece of glass. An experimental silicone pottant was used as the transparent bonding adhesive between the cells and glass. The semi-flexible portion of each shingle module is a composite laminate construction consisting of an outer layer of FLEXSEAL bonded to an inner core of closed cell polyethylene foam. Silaprene is used as the substrate laminating adhesive. The module design has satisfactorily survived qualification testing program which includes 50 thermal cycles between -40 and +90 C, a seven day temperature-humidity exposure test, and a wind resistance test.

N80-26777/6 PC **A07**/MF **A01**
Sanders Associates, Inc., Nashua, NH. Energy Systems Center.
Development of an Air Brayton Solar Receiver.
1980, 149p NASA-CR-163027, JPL-9950-351
Contract JPL-955120

Various receiver configurations and operating conditions were examined. The interface requirements between the receiver/concentrator/power module were addressed. Production cost estimates were obtained to determine the cost of the receiver during the 1980 timeframe. A conceptual design of an air Brayton solar receiver is presented based on the results. The following design goals were established: (1)peak thermal input power - 85 KWt; (2)receiver outlet air temperature - 1500 F; (3)receiver inlet air temperature - 1050 F; (4)design mass flow rate - 0.533 lb/sec; and (5)design receiver inlet pressure - 36.75 psia.

N80-26779/2 PC **A16**/MF **A01**
General Electric Co., Philadelphia, PA. Space Sciences Lab.
Parametric Study of Prospective Early Comerical MHD Power Plants (PSPEC). General Electric Company, Task 1: Parametric Analysis.
Final Report.
C. H. Marston, F. N. Alyea, D. J. Bender, L. K. Davis, and T. C. Dellinger. Feb 80, 358p NASA-CR-159634, DOE/NASA/0052-79/1
Contracts DEN3-52, EF-77-A01-2674
Prepared in Cooperation with Foster Wheeler Corp., Livingston, N.J., Hooker Chemical CO., Niagara Falls, N.Y. And Bechtel National, Inc., San Francisco.

The performance and cost of moderate technology coal-fired open cycle MHD/steam power plant designs which can be expected to require a shorter development time and have a lower development cost than previously considered mature OCMHD/steam plants were determined. Three base cases were considered: an indirectly-fired

high temperature air heater (HTAH) subsystem delivering air at 2700 F, fired by a state of the art atmospheric pressure gasifier, and the HTAH subsystem was deleted and oxygen enrichment was used to obtain requisite MHD combustion temperature. Coal pile to bus bar efficiencies in ease case 1 ranged from 41.4% to 42.9%, and cost of electricity (COE) was highest of the three base cases. For base case 2 the efficiency range was 42.0% to 45.6%, and COE was lowest. For base case 3 the efficiency range was 42.9% to 44.4%, and COE was intermediate. The best parametric cases in bases cases 2 and 3 are recommended for conceptual design. Eventual choice between these approaches is dependent on further evaluation of the tradeoffs among HTAH development risk, O2 plant integration, and further refinements of comparative costs.

N80-26780/0 PC **A10**/MF **A01**
MB Associates, San Ramon, CA.
Process Development for Automated Solar Cell and Module Production. Task 4: Automated Array Assembly.
Final Report.
30 Jun 80, 204p NASA-CR-163032, DOE/JPL-954882-80/21
Contract JPL-954882

A process sequence which can be used in conjunction with automated equipment for the mass production of solar cell modules for terrestrial use was developed. The process sequence was then critically analyzed from a technical and economic standpoint to determine the technological readiness of certain process steps for implementation. The steps receiving analysis were: back contact metallization, automated cell array layup/interconnect, and module edge sealing. For automated layup/interconnect, both hard automation and programmable automation (using an industrial robot) were studied. The programmable automation system was then selected for actual hardware development.

N80-26781/8 PC **A09**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Study of Curved Glass Photovoltaic Module and Module Electrical Isolation Design Requirements.
Final Report.
Jun 80, 182p NASA-CR-163033, DOE/JPL-954698-80/2
Contract JPL-954698

The design of a 1.2 by 2.4 m curved glass superstrate and support clip assembly is presented, along with the results of finite element computer analysis and a glass industry survey conducted to assess the technical and economic feasibility of the concept. Installed costs for four curved glass module array configurations are estimated and compared with cost previously reported for comparable flat glass module configurations. Electrical properties of candidate module encapsulation systems are evaluated along with present industry practice for the design and testing of electrical insulation systems. Electric design requirements for module encapsulation systems are also discussed.

N80-26782/6 PC **A03**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
High Resolution, Low Cost Solar Cell Contact Development.
Final Report.
N. Mardesich. Dec 79, 50p NASA-CR-163289, DOE/JPL-955298-80/2
Contracts NAS7-100, JPL-955298

The experimental work demonstrating the feasibility of the MIDFILM process as a low cost means of applying solar cell collector metallization as reported. Cell efficiencies of above 14% (AMI, 28 C) were achieved with fritted silver metallization. Environmental tests suggest that the metallization is slightly humidity sensitive and degradation is observed on cells with high series resistance. The major yield loss in the fabrication of cells was due to discontinuous grid lines, resulting in high series resitance. Standard lead-tin solder plated interconnections do not appear compatible with the MIDFILM contact. Copper, nickel and molybdemun base powder were investigated as low cost metallization systems. The copper based powder degraded the cell response. The nickel and molybdenum base powders oxidized when sintered in the oxidizing atmosphere necessary to ash the photoresin.

N80-26783/4 PC **A03**/MF **A01**
Syncal Corp., Sunnyvale, CA.
Development of Advanced Thermoelectric Materials, Phase A.
30 May 80, 42p NASA-CR-163041, JPL-9950-370
Contract JPL-954349

Work performed on the chemical system characterized by chrome sulfide, chrome selenide, lanthanum selenide, and lanthanum sulfide is described. Most materials within the chemical systems possess the requisites for attractive thermoelectric materials. The preparation of the alloys is discussed. Graphs show the Seebeck coefficient, electrical resistivity, and thermal conductivity of various materials within the chemical systems. The results of selected doping are included.

N80-26784/2 PC **A06**/MF **A01**
Aerospace Corp., El Segundo, CA.
Central Station Applications Planning Activities and Supporting Studies.
Final Report.
S. L. Leonard, and B. Siegel. Apr 80, 117p NASA-CR-163042, JPL-9950-372
Contract JPL-955434

The application of photovoltaic technology in central station (utility) power generation plants is considered. A program of data collection and analysis designed to provide additional information about the subset of the utility market that was identified as the initial target for photovoltaic penetration, the oil-dependent utilities (especially muncipals) of the U.S. Sunbelt, is described along with a series of interviews designed to ascertain utility industry opinions about the National Photovoltaic Program as it relates to central station applications.

N80-26859/2 PC **A10**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
International Photovoltaic Program. Volume 2: Appendices.
D. Costello, R. Koontz, D. Posner, P. Heiferling, and P. Carpenter. Dec 79, 218p NASA-CR-163339
Contract EG-77-C-01-4042
Prepared Jointly with Midwest Research Inst., Golden, Colo., Massachusetts Inst. Of Technol. Cambridge and Illinois Inst. Of Technol., Chicago.

The results of analyses conducted in preparation of an international photovoltaic marketing plan are summarized. Included are compilations of relevant statutes and existing Federal programs; strategies designed to expand the use of photovoltaics abroad; information on the domestic photovoltaic plan and its impact on the proposed international plan; perspectives on foreign competition; industry views on the international photovoltaic market and ideas about the how US government actions could affect this market;international financing issues; and information on issues affecting foreign policy and developing countries.

N80-26878/2 PC **A03**/MF **A01**
AEG-Telefunken, Wedel (West Germany). Fachbereich Raumfahrt, Neue Technologien.
Design and Fabrication of Terrestrial Photovoltaic Solar Generators for Field Testing in Regions of Intensitive Insolation.
Final Report.
H. D. Wegmann. Oct 79, 36p BMFT-FB-T-79-34
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The design and production of photovoltaic solar energy converters is described for three different applications: a transmitter station, a navigation buoy, and a laboratory building. The collectors consisted of interconnected 5 cm x 5 cm silicon solar cells encapsulated in glass or glass fiber reinforced acrylic resin. The largest device delivered 2000 W of electrical power.

PATENT-4 189 647
Not available NTIS
Department of Energy, Washington, DC.
Open Cycle Ocean Thermal Energy Conversion System.
Patent,
J. M. Wittig. Filed 17 Aug 78, patented 19 Feb 80, 8p PAT-APPL-934 572
Supersedes PAT-APPL-934 572-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved open cycle ocean thermal energy conversion system is described including a flash evaporator for vaporizing relatively warm ocean surface water and an axial flow, elastic fluid turbine having a vertical shaft and axis of rotation. The warm ocean water is transmitted to the evaporator through a first prestressed concrete skirtconduit structure circumferentially situated about the axis of rotation. The unflashed warm ocean water exits the evaporator through a second prestressed concrete skirt-conduit structure located circumferentially about and radially within the first skirt-conduit structure. The radially inner surface of the second skirt conduit structure constitutes a cylinder which functions as the turbine's outer casing and obviates the need for a conventional outer housing. The turbine includes a radially enlarged disc element attached to the shaft for supporting at least one axial row of radially directed blades through which the steam is expanded. A prestressed concrete inner casing structure of the turbine has upstream and downstream portions respectively situated upstream and downstream from the disc element. The radially outer surfaces of the inner casing portions and radially outer periphery of the axially interposed disc cooperatively form a downwardly radially inwardly tapered surface. An annular steam flowpath of increasing flow area in the downward axial direction is radially bounded by the inner and outer prestressed concrete casing structures. The inner casing portions each include a tranversely situated prestressed concrete circular wall for rotatably supporting the turbine shaft and associated structure. (ERA citation 05:025661)

PB80-196652 PC **A06**/MF **A01**
Office of Management and Budget, Washington, DC.
Coal-Fired Powerplants' Federal Permit Status Report. Third Edition.
May 80, 125p
See also report dated Apr 79, PB-297 966.

The printout of projected coal-fired powerplants is broken out alphabetically by state, by standard Federal regions, and further subdivided into three distinct categories: Coal-fired powerplants planned and no Federal permitting application received; Coal-fired powerplants with pending Federal permit application; Coal-fired powerplants that have completed the Federal permitting criteria. In the last section of the report labelled Statistics, a summary of the status of permitting actions is shown by standard Federal region, by state within the standard Federal region, and by the total United States.

PB80-201825 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
Recent Developments in Ocean Thermal Energy.
Technical memo.
Apr 80, 40p OTA-TM-003
Update to report dated May 78, PB-283 104. Library of Congress catalog card no. 80-600074.

This report reviews the status of OTEC technology developments as of April 1980. It discusses major technical accomplishments occurring after publication of the 1978 report and principal technical uncertainties that remain.

PB80-809098 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Inverter Converters. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80.
Robert Hippler. May 80, 118p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works cover the field of electrical devices which convert direct to alternating current. Some of the applications discussed are motor and furnace drives, solar and wind generated electrical

power conversion, variable-frequency devices for motor speed-control drives, and power frequency conversion devices. The components used in these devices such as thyristors, SCRs, MOS devices, etc., and the associated circuitries, are described. (Contains 125 citations)

PB80-809106 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Inverter Converters. 1964-April, 1980 (Citations from the American Institute of Aeronautics and Astronautics, Inc.).
Rept. for 1964-Apr 80,
Robert Hippler. May 80, 109p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works cover the field of electrical devices which convert direct to alternating current. Some of the applications discussed are motor and furnace drives, solar and wind generated electrical power conversion, variable-frequency devices for motor speed-control drives, and power frequency conversion devices. The components used in these devices, such as thyristors, SCRs, MOS devices, etc., and the associated circuitries, are described. (Contains 104 citations)

PNL-2521(Rev.1) PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Siting Handbook for Small Wind Energy Conversion Systems.
H. L. Wegley, J. V. Ramsdell, M. M. Orgill, and R. L. Drake. Mar 80, 90p
Contract EY-76-C-06-1830

This handbook was written to serve as a siting guide for individuals wishing to install small wind energy conversion systems (WECS); that is, machines having a rated capacity of less than 100 kilowatts. It incorporates half a century of siting experience gained by WECS owners and manufacturers, as well as recently developed siting techniques. The user needs no technical background in meteorology or engineering to understand and apply the siting principles discussed; he needs only a knowledge of basic arithmetic and the ability to understand simple graphs and tables. By properly using the siting techniques, an owner can select a site that will yield the most power at the least installation cost, the least maintenance cost, and the least risk of damage or accidental injury. (ERA citation 05:022325)

RFP-3004(V.1) PC **A06**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Rocky Flats Small Wind Systems Test Center Activities. Volume I. Atmospheric Test Data Collected from Small Wind Energy Conversion Systems. Second Interim Report.
Jul 79, 122p
Contract EY-76-C-04-3533

The wind system data presented in this report represents the results of various tests of SWECS installed at the Rocky Flats Small Wind Systems Test Center as of June 30, 1979. Much of the data are not final, but are believed to present an accurate representation of the performance of each system. Because of operating problems and failures experienced by some of the machines (and at times by the data collection system) the amount of data available for analysis varies widely from system to system. Data are presented on a total of 16 machines, including updated data on nine machines which were presented in the first semiannual report. Vibration, controlled velocity testing and plans for a dynamometer test facility (which is under construction) are described. The description of each system under test includes information on design output, output type, rotor configuration, and other basic design features. The condition under which each SWECS was tested are described. Graphic plots of quantitative data and narrative accounts of qualitative data collected on each SWECS are provided. (ERA citation 05:022298)

RFP-3034/3533/79-5 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Sencenbaugh: Model 1000-14 Wind Turbine Generator. Performance Report.
K. K. Higashi. Jul 79, 14p
Contract AC04-76DP03533

Data are provided which gives an accurate picture of the performance of the Sencenbaugh Model 1000-14 under conditions approximating normal use. Every effort has been made to ensure that the data provided are accurate. The calibration of all instruments is continuously maintained. The tests for the Sencenbaugh Model 1000-14 wind system are designed to develop a power curve for a known load (application) and determine the ability of the machine to survive high winds (85 mph or greater). The Sencenbaugh has been tested under a variety of tail assembly adjustment modes. These adjustments were possible on all early models of the system. Performance data were collected for the various adjustments, and some of these data are presented. However newer models of the Sencenbaugh no longer permit these adjustments. (ERA citation 05:022319)

SAN-0113-040-T7 PC **A03**/MF **A01**
University of Southern California, Los Angeles. Dept. of Materials Science.
Low Cost Solar Cells Basd on Amorphous Silicon Electrodeposited from Organic Solvents. Technical Quarterly Progress Report No. 3, March 1-May 31, 1979.
F. A. Kroger. 1980, 30p
Contract EY-76-S-03-0113-040

Electrolysis experiments were carried out using tetra ethyl ortho silicate plus propylene carbonate or 1-chloropropane or acetic acid or formamide and ammonium hexafluorosilicate plus formamide. These experiments yielded deposits which vary in colour between white and black with greyish white, light or dark brown as intermediate colours depending on the deposition conditions. Energy dispersive x-ray analysis in the scanning electron microscope indicated the deposits to contain large concentrations of silicon; infrared absorption and reflection studied showed bands characteristic of Si-O, Si-Cl or Si-F vibrations and thus indicates the presence of these elements in the films. Determination of carrier type in doped deposits by hot point probe method was not successful. (ERA citation 05:021996)

SAN-1202-78/3 PC **A03**/MF **A01**
Rockwell International, Anaheim, CA.
Thin Films of Gallium Arsenide on Low-Cost Substrates. Quarterly Technical Progress Report No. 8 and Topical Report No. 3, April 2-July 1, 1978.
R. P. Ruth, P. D. Dapkus, R. D. Dupuis, R. E. Johnson, and H. M. Manasevit. Jul 78, 45p
Contract EY-76-C-03-1202

The seventh quarter of work on the contract is summarized. The metalorganic chemical vapor deposition (MO-CVD) technique has been applied to the growth of thin films of GaAs and GaAlAs on inexpensive polycrystalline or amorphous substrate materials (primarily glasses and metals) for use in fabrication of large-area low-cost photovoltaic device structures. Trimethylgallium (TMG), arsine (AsH sub 3), and trimethylaluminum (TMAl) are mixed in appropriate concentrations at room temperature in the gaseous state and pyrolyzed at the substrate, which is heated in a vertical reactor chamber to temperatures of 725 to 750 exp 0 C, to produce the desired film composition and properties. The technical activities during the quarter were concentrated on (1) a continuing evaluation of various graphite materials as possible substrates for MO-CVD growith of the polycrystalline GaAs solar cells; (2) attempts to improve the quality (especially the grain size) of polycrystalline GaAs films on Mo sheet and Mo/glass substrates by using HCl vapor during the MO-CVD growith process; (3) further studies of the transport properties of polycrystalline GaAs films, wth emphasis on n-type films; (4) continuing investigations of the properties of p-n junctions in polycrystalline GaAs, with emphasis on the formation and properties of p exp + /n/n exp + deposited structures; and (5) assembling apparatus and establishing a suitable technique for producing TiO sub 2 layers for use as AR coatings on GaAs cells. Progress is reported. (ERA citation 05:021997)

SAN-1889-T1 PC **A04**/MF **A01**
TRW Energy Systems Group, Redondo Beach, CA.
Feasibility Study for Industrial Cogeneration Fuel Cell Application.
15 Nov 79, 67p
Contract ET-78-C-03-1889

A study of the feasibility of using a first generation, phosphoric acid fuel cell as a cogenerating, total energy system for aluminum processing is presented. The objectives of the study were to: (1) determine the technical, institutional, and economic factors which would make the first generation fuel cell attractive; (2) identify modifications of fuel cell technology which would enhance fuel cell attractiveness in an industrial climate; and (3) define institutional and economic changes which might enhance fuel cell attractiveness. The study incorporated a number of tasks, involving site selection, thermal and electrical load characterization, definition of fuel cell fuel supply options, evaluation of environmental impacts, and consideration of ownership options. Results are presented. (ERA citation 05:022529)

SAND-79-7056 PC **A09**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Design of a Photovoltaic System for a Southwest All-Electric Residence.
E. M. Mehalick, G. O'Brien, G. F. Tully, J. Johnson, and J. Parker. Apr 80, 197p
Contract EY-76-C-04-0789

The grid connected residential photovoltaic system for the Southwest is designed to meet both space conditioning requirements and all conventional electrical load requirements for an all-electric residence. The system is comprised of two major subsystems, the solar array and the power conditioning subsystem (PCS). An 8 kW peak photovoltaic array has been designed for the house. The 93 m exp 2 solar array uses a shingle solar cell module, being developed by General Electric as part of the JPL Block IV procurement, in a highly redundant series/parallel matrix. The photovoltaic generated power is supplied to a 10 kVA power conversion subsystem which is controlled to track the solar array maximum power operating point and feed the 240 Vac output power directly to the house loads or back to the utility when excess power is generated. The PV power is isolated from the utility by a 15 kVA transformer. The house design and subsystem specifications are given in detail. This design represents the first of five detailed residential designs which will be developed under this program. (ERA citation 05:022030)

SAND-80-0873C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design and Performance of an 11 KW Solar Array Simulator.
D. R. Smith, G. A. O'Sullivan, and F. K. O'Sullivan. 1980, 6p CONF-800624-2
Contract EY-76-C-04-0789
Power electronics specialists conference, Atlanta, GA, USA, 17 Jun 1980.

A Solar Array Simulator combines a high efficiency switching regulator, a high performance series regulator, and a low power analog adjustable I-V generator to duplicate the static and dynamic characteristics of photovoltaic cells operated in series-parallel combinations. Both voltage and current feedback are used to control the switching and series regulators. Stability of the series regulator over a wide range of load time constants is achieved by a compensation technique. Current-voltage and transient response characteristics of the Simulator are presented. The device was also operated into a 10 kW inverter designed for photovoltaic applications. (ERA citation 05:023852)

SAND-80-0926C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Photovoltaic Systems and Applications Perspective.
G. J. Jones. 1980, 7p CONF-800604-14
Contract EY-76-C-04-0789
American section of the International Solar Energy Society conference, Phoenix, AZ, USA, 2 Jun 1980.

The National Photovoltaic Program is currently in the process of increasing emphasis on full-scale system experiments in the potential user environment, a natural coccurrence in the evolution of system design and development. At this point

large amounts of design information are available and need to be brought together in usable form to support this effort. The state of understanding in the system definition area for the major applications is reviewed, and the remaining issues, especially as they impact the field test activities, are indicated. (ERA citation 05:023820)

SAND-80-8177 PC **A06**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
STEAMFREQ-I: A Model for Dynamic Stability Analysis of Steam Generators with Imposed Heat Flux Distribution.
K. C. Chan, S. Wolf, and G. Yadigaroglu. Jan 80, 120p
Contract EY-76-C-04-0789

The results of analysis to develop an advanced computer model, STEAMFREQ-I, for the investigation of density-wave instabilities in steam generators with imposed heat flux are presented. The key model features include a drift flux flow model in the boiling region, spatial variation of heat flux, wall dynamics, and variable steam properties in the superheat region. Stability predictions for STEAMFREQ-I are compared with those from two other codes. In addition, stability predictions are compared with data representing unstable and stable conditions obtained from a solar receiver panel test and with stability threshold data from a sodium-heated steam generator test. (ERA citation 05:022035)

SERI/TP-331-541 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Overview of Thick-Film Technology as Applied to Solar Cells.
K. Firor, and S. Hogan. Jan 80, 8p
Contract EG-77-C-01-4042

Thick-film technology was developed by the electronics industry as a means of fabricating components and miniature circuitry. Today, the solar cell industry is looking at screen printing as an alternate to more expensive, high-vacuum techniques in several of the production steps during the manufacture of silicon solar cells. Screen printing is already fairly well established as a means of providing electrical contact to a cell and for the formation of a back surface field. Now under investigation are the possibilities of non-noble metal contacts and protective and antireflective coatings applied to solar cells by the use of screen printing. Most exciting is the work being done in the non-silicon area on the fabrication of the active layers of a solar cell, using thick-film inks made up of II-VI semiconductors. (ERA citation 05:023821)

SERI/TP-731-649 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Screening Method for Wind Energy Conversion Systems.
R. D. McConnell. Mar 80, 6p CONF-800604-19
Contract EG-77-C-01-4042
American section of the International Solar Energy Society conference, Phoenix, AZ, USA, 2 Jun 1980.

A screening method is presented for evaluating wind energy conversion systems (WECS) logically and consistently. It is a set of procedures supported by a data base for large conventional WECS. The procedures are flexible enough to accommodate concepts lacking cost and engineering detail, as is the case with many innovative wind energy conversion systems (IWECS). The method uses both value indicators and simplified cost estimating procedures. Value indicators are selected ratios of engineering parameters involving energy, mass, area, and power. Cost mass ratios and cost estimating relationships were determined from the conventional WECS data base to estimate or verify installation cost estimates for IWECS. These value indicators and cost estimating procedures are shown for conventional WECS. An application of the method to a tracked-vehicle airfoil concept is presented. (ERA citation 05:024003)

SERI/TR-311-493 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
MIS And SIS Solar Cells on Polycrystalline Silicon.
G. Cheek, and R. Mertens. Feb 80, 33p
Contract EG-77-C-01-4042

MIS and SIS structured solar cells are receiving much attention in the photovoltaic community. Seemingly, these cells could be a viable alternative to thermally diffused p-n junctions for use on thin-film polycrystalline silicon substrates. This review describes MIS/SIS structured solar cells and the possible advantages of these structures for use with thin-film polycrystalline silicon. The results of efficiency calculations are presented. Also addressed are lifetime stability and fabrication techniques amenable to large scale production. Finally, the relative advantages and disadvantages of these cells and the results obtained are presented. (ERA citation 05:021999)

SERI/TR-352-298 PC **A06**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Photovoltaic Procurement Strategies: An Assessment of Supply Issues.
D. Posner, and D. Costello. Feb 80, 106p
Contract EG-77-C-01-4042

This review report presents the results of an analysis of alternative approaches to the design of a federal photovoltaics procurement program. Advantages and disadvantages of large purchases at fixed prices and smaller purchases for testing and demonstrating the technology are presented. The objectives and possible impacts of these purchase programs on the photovoltaic industry are described. The reactions of the industry to alternative purchase programs were assessed using personal interviews with selected companies currently active in photovoltaics. The report begins with a review of the impacts of federal procurements on other innovations, including the electronics industry, and suggests the relation of these procurements to photovoltaics. The methodology for conducting the interviews is presented next. The results of the interviews are summarized into possible scenarios of future developments in the industry and into discussions of key issues in the design of a procurement program. An appendix on the current structure of the photovoltaic industry is provided. (ERA citation 05:023853)

SERI/TR-431-580 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Economics of Selected WECS Dispersed Applications.
S. Krawiec. Apr 80, 41p
Contract EG-77-C-01-4042

An economic analysis for distributed Wind Energy Conversion Systems (WECS) has been conducted for the Department of Energy (DOE) as part of the Solar Commercial Readiness Assessment task at the Solar Energy Research Institute (SERI). The objective of this paper is to analyze: the cost of electricity generated by selected wind energy systems in residential and agricultural applications; the breakeven cost of wind systems able to compete economically with conventional power sources in dispersed applications; and the impact of major economic factors on the cost performance index. Two major measures of economics used are breakeven period and levelized cost of electricity (life-cycle cost). The cost performance index was calculated for a dispersed application of a commercially available 10 kW wind turbine generator. All-electric homes consuming 15,000 kWh annually or more have been selected for analysis. The agricultural application is represented by a commercial poultry and egg farm demanding over 92,000 kWh annually. (ERA citation 05:022291)

SERI/TR-632-439 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Long-Term Average Performance Benefits of Parabolic Trough Improvements.
R. Gee, H. W. Gaul, D. Kearney, and A. Rabl. Mar 80, 40p
Contract EG-77-C-01-4042

Improved parabolic trough concentrating collectors will result from better design, improved fabrication techniques, and the development and utilization of improved materials. The difficulty of achieving these improvements varies as does their potential for increasing parabolic trough performance. The purpose of this analysis is to quantify the relative merit of various technology advancements in improving the long-term average performance of parabolic trough concentrating collectors. The performance benefits of improvements are determined as a function of operating temperature for north-south, east-west, and polar mounted parabolic troughs. The results are presented graphically to allow a quick determination of the performance merits of particular improvements. Substantial annual energy gains are shown to be attainable. Of the improvements evaluated, the development of stable back-silvered glass reflective surfaces offers the largest performance gain for operating temperatures below 150 exp 0 C. Above 150 exp 0 C, the development of trough receivers that can maintain a vacuum is the most significant potential improvement. The reduction of concentrator slope errors also has a substantial performance benefit at high operating temperatures. (ERA citation 05:020440)

UCID-18654 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technical Evaluation of the Proposed Design Modifications and Technical Specification Changes on Grid Voltage Degradation for the Prairie Island Nuclear Generating Plant Units 1 and 2. (Docket Nos. 50-282, 50-306).
R. L. White. Mar 80, 21p
Contract W-7405-ENG-48

This report documents the technical evaluation of the proposed design modifications and technical specification changes on grid voltage degradation for the Prairie Island Nuclear Generating Plant. The review criteria are based on IEEE Std-279-1971, IEEE Std-308-1974, and General Design Criterion 17 of the Code of Federal Regulations, Title 10, part 50, Appendix A requirements for determining the acceptability of the proposed system to protect the safety-related equipment from degradation of grid voltages. (ERA citation 05:022409)

UCRL-15213 PC **A10**/MF **A01**
Texas Univ. at Austin. Center for Electromechanics.
Detailed Design, Fabrication and Testing of an Engineering Prototype Compensated Pulsed Alternator. Final Report.
W. L. Bird, Jr., and H. H. Woodson. Mar 80, 213p
Contract W-7405-ENG-48

The design, fabrication, and test results of a prototype compensated pulsed alternator are discussed. The prototype compulsator is a vertical shaft single phase alternator with a rotating armature and salient pole stator. The machine is designed for low rep rate pulsed duty and is sized to drive a modified 10 cm Beta amplifier. The load consists of sixteen 15 mm x 20 mm x 112 cm long xenon flashlamps connected in parallel. The prototype compulsator generates an open circuit voltage of 6 kV, 180 Hz, at a maximum design speed of 5400 rpm. At maximum speed, the inertial energy stored in the compulsator rotor is 3.4 megajoules. (ERA citation 05:023372)

10C. Energy Storage

AD-A086 051/0 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Investigation of Methods to Predict Thermal Stratification and Its Effect on Solar Energy System Performance.
Special rept.,
B. J. Sliwinski. May 80, 33p Rept no. CERL-SR-E-160

this report describes a study to identify characteristics which induce thermal stratification in liquid thermal storage, and to evaluate solar energy system performance as a function of the degree of stratification. It was determined that for efficient use of thermal stratification it was necessary to (1) introduce hot fluid at the top of the liquid storage tank and to add cold fluid at the bottom of the tank, (2) with a cylindrical tank, have a length/diameter ratio equal to or greater than 2.0, (3) use mathematical correlations to determine allowable fluid inlet velocities and temperatures, and (4) use storage tank material that has a thermal conductivity less than that of the storage fluid. The mathematical correlations described in this report allow stratification occurrence to be predicted and can

be used to estimate the sharpness of the thermocline based on tank inlet and outlet conditions, fluid properties, and storage tank geometry. (Author)

ANL-80-16 PC **A07/MF A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Conceptual Design of Electrical Balance of Plant for Advanced Battery Energy Storage Facility. Annual Report, March 1979.
Jan 80, 137p
Contract W-31-109-ENG-38

Large-scale efforts are in progress to develop advanced batteries for utility energy storage systems. Realization of the full benefits available from those systems requires development, not only of the batteries themselves, but also the ac/dc power converter, the bulk power interconnecting equipment, and the peripheral electric balance of plant equipment that integrate the battery/converter into a properly controlled and protected energy system. This study addresses these overall system aspects; although tailored to a 20-MW, 100-MWh lithium/sulfide battery system, the technology and concepts are applicable to any battery energy storage system. 42 figures, 14 tables. (ERA citation 05:024155)

ANL-80-30 PC **A04/MF A01**
Argonne National Lab., IL.
Analysis of an Internally Pressurized Prismatic Cell Can.
S. Majumdar. Apr 80, 62p
Contract W-31-109-ENG-38

This report contains an elastic stress and displacement analysis of a prismatic cell can subjected to internal pressure. A computer program was written to perform the analysis. The results show that, for the geometry chosen, the thicknesses of the cell-can walls and the magnitude of the internal pressure are the most important parameters that determine the stresses and deformations of the cell can. Recommendations for future studies are included. 21 figures, 1 table. (ERA citation 05:024156)

ANL-80-32 PC **A03/MF A01**
Argonne National Lab., IL.
Development of Advanced Batteries at Argonne National Laboratory. Summary Report for 1979.
Apr 80, 46p
Contract W-31-109-ENG-38

A summary for 1979 of Argonne National Laboratory's program on the development of advanced batteries is presented. These batteries are being developed for electric-vehicle propulsion and stationary energy-storage applications. The principal cells under investigation at present are of a vertically oriented, prismatic design with one or more inner positive electrodes of FeS or FeS sub 2 , facing negative electrodes of Li-Al alloy, and molten LiCl-KCl electrolyte; the cell operating temperature is 400 to 500 exp 0 C. A small effort on the development of a calcium/metal sulfide cell is also being conducted. During 1979, cell and battery development work continued at ANL and contractors' laboratories. A 40-kWh electric-vehicle battery (designated Mark IA) was fabricated and delivered by Eagle-Picher Industries, Inc. to ANL for testing. During heat-up, one of the modules failed due to a short circuit. A failure analysis was conducted, and the Mark IA program, completed. Development work on the next electric-vehicle battery (Mark II) was initiated at Eagle-Picher and Gould, Inc. Work on stationary energy-storage batteries consisted primarily of conceptual design studies. 9 figures, 7 tables. (ERA citation 05:024103)

BNL-51070 PC **A03/MF A01**
Brookhaven National Lab., Upton, NY.
Hydrogen/Halogen Energy Storage System: Safety, Performance, and Cost Assessment. Final Report.
P. M. Spaziante, G. C. Sioli, and R. Trotta. Feb 79, 34p
Contract EY-76-C-02-0016

The aim of this work was to make realistic assessments of the safety, performance, and installation costs of an electrochemically regenerative H sub 2 /Cl sub 2 energy storage system based on detailed engineering designs of plant configurations. Extensive laboratory tests in FY 1976, 1977, and 1978 provided the needed theoretical and experimental data for this study. The effectiveness of this scheme of energy storage required practical confirmation. In this assessment particular care was taken to list and include all the secondary units needed for plant operation. Results are detailed. (ERA citation 05:022350)

CONF-781063-7 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Electrolysis of Molten NaNO sub 3 -AgNO sub 3 as Test of a Model of Transport in Batteries.
C. E. Vallet, D. E. Heatherly, and J. Braunstein. 1978, 11p
Contract W-7405-ENG-26
Symposium on molten salts, Pittsburgh, PA, USA, 15 Oct 1978.

Concentration changes resulting from electrolysis of 0.8 NaNO sub 3 -0.2 AgNO sub 3 mixtures between silver electrodes were measured by potentiometric analysis during electrolysis (with current interruption); emf relaxation following electrolysis; chemical analysis of sections of frozen electrolyte. Enrichment in NaNO sub 3 at the cathode and in AgNO sub 3 at the anode are observed. The measurements confirm predictions from a model of component separation in mixed molten salt batteries with faradaic, migrational, and diffusional flows analogous to those in Li/LiCl-KCl/S batteries. 4 figures, 2 tables. (ERA citation 05:024122)

COO-4881-3 PC **A04/MF A01**
Prototech Co., Newton Highlands, MA.
Energy Savings by Means of Fuel Cell Electrodes in Electro-Chemical Industries. Progress Report, August 1-October 31, 1978.
R. J. Allen, W. Juda, and R. W. Lindstrom. Dec 78, 69p
Contract ET-78-C-02-4881

Caustic half cells are described and data reported for tests run to evaluate the technology involved in the operation of air cathodes for the Caustic-Chlorine Industry. The majority of tests were run at 300 ASF in a 23% NaOH electrolyte at 75 exp 0 C with a CO sub 2 free air efficiency of 33%. Data are presented for a 7200-h life test which is in operation and represents the state of the art. Runs have been made to identify the limiting current density and air efficiency for the standard RA19 type air cathode. Also presented are tests involving cell temperature, electrode platinum variation and evaluation of several thin, porous, conducting substrates on which the catalyst layer is deposited during electrode fabrication. Technical data on advisory meetings and experimental cell design for hydrogen anode evaluation in the electrowinning of zinc were reported. Preliminary results demonstrate a savings of over 0.6 kWh/lb of zinc for 3 to 4 hours runs employing pure hydrogen as fuel and a 0.33 mg/cm exp 2 Pt anode. In the area of metal-water-air batteries a consultatory meeting was held, and the initial data obtained at Lawrence Livermore Laboratory for a standard Prototech Company air cathode in an Aluminum-Air Battery were reported to be most encouraging. (ERA citation 05:024498)

DOE/CS/34702-4 PC **A02/MF A01**
Suntek Research Associates, Corte Madera, CA.
Engineering Design for Thermocrete Central Storage Units for Low Temperature Solar Application. Final Report.
Sep 79, 10p
Contract AC02-78CS34702

The overall objective was to produce a set of value-engineered blueprints for mass-produced modular phase-change thermal storage units. As a result of the failure of Thermocrete samples during thermal evaluation, DOE project management and Suntek agreed that work on Thermocrete should be stopped at the end of September 1978, and that work should commence on incorporating Heat Mirror transparent insulation into windows and skylights. Since work on Thermocrete was stopped at approximately 20% complete, no blueprints were produced nor were any firm conclusions reached. The technical report outlines briefly the status of each section of the work statement when the project was stopped. (ERA citation 05:022242)

N80-26369/2 PC **A02/MF A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Dept. Etudes Speciales.
A Magnetic Suspension with Passive Radial Centering for Satellite Flywheel and Kinetic Energy Storage Systems.
P. C. Poubeau. 1979, 23p SNIAS-792-422-111
Sponsored by Intern. Telecommun. Satellite Organ., Esa, and Cnes. Presented at 3D Intern. Workshop on Rare Earth-Colbalt Permanent Magnets and Their Appl., San Diego, Calif., 27-30 Jun. 1978.

The overall concept of satellite flywheels is described as well as their rotor magnetic suspension and associated sub-systems. The possible evolution of such equipment towards kinetic energy storage systems which could be utilized for satellite as well as for ground applications in a wide range of rotation speeds is examined.

N80-26880/8 PC **A05/MF A01**
Open Univ., Milton (England). Energy Research Group.
A Chemical Heat-Pump/Energy Storage Device and its Applications.
Sep 78, 78p ERG-030
Contract SRC-G/RA/5360.4
Prepared Jointly with Rutherford High Energy Lab., Chilton, England.

A prototype heat-pump was constructed and operated, using sulfuric acid and water as the chemical pair. It achieved a power output of 3.5 kW (this with malfunctioning heat exchangers). The heat-pump chemicals can be reconcentrated either using heat (greater than 120 C) or electricity; in the latter case the chemicals store heat-pumping capacity (with a COP of about 1.5). Thus the chemical heat-pump may find application in conjunction with either waste-heat or off-peak electricity (from nuclear, wind or wave devices at any time other than peak demand time). On the basis of present cost-assumptions, the chemical heat-pump may be immediately cost-effective: using waste heat to provide industrial process heat, using waste heat to provide space-heating and cooling, and as an off-peak heat-pump (reconcentration by electricity). Industrial heat demand in the dairy, bottle washing and brewing industries was analyzed.

ORNL/Sub-7338/1 PC **A04/MF A01**
Auburn Univ., AL. Water Resources Research Inst.
Experimental Study of the Storage of Thermal Energy in Confined Aquifers. Final Report, July 1, 1977-December 31, 1979.
F. J. Molz, A. D. Parr, and P. F. Andersen. May 80, 51p
Contract W-7405-ENG-26

To aid in testing the idea of storing thermal energy in aquifers, a two cycle experiment was performed by Auburn University in which heated water was stored in a confined aquifer and then recovered. During the first cycle, 54,784 m exp 3 of water were pumped from a shallow supply aquifer, heated to an average temperature of 55 exp 0 C, and injected into a deeper confined aquifer where the ambient temperature was 20 exp 0 C. After a storage period of 51 days, 55,345 m exp 3 of water were produced from the confined aquifer. Throughout the first cycle, which lasted approximately six months, ground water temperatures were recorded at six depths in each of ten observation wells, and hydraulic heads were recorded in five observation wells. During the 41-day production period, the temperature of the produced water varied from 55 exp 0 C to 33 exp 0 C, and 66% of the injected thermal energy was recovered. The second cycle injection began on 9/23/78 and continued until 11/25/78 when 58,010 m exp 3 of water had been recovered. The major problem experienced during the first cycle, a clogging injection well, was reduced by regular backwashing. A 63 day storage period ended on 1/27/79 and production of hot water began with an initial temperature of 54 exp 0 C. By 3/23 this temperature had dropped to 33 exp 0 C, with 66,400 m exp 3 of water and 76% of the injected thermal energy recovered. (ERA citation 05:022473)

ORNL/Sub-7641/1 PC **A04/MF A01**
Dayton Univ., OH. Research Inst.

Electron Beam Irradiation of High Density Polyethylene Pellets for Thermal Energy Storage. Final Report of Task 1 and Task 2, January 5, 1979-January 4, 1980.
J. E. Davison, and I. O. Salyer. May 80, 69p
Contract W-7405-ENG-26

The objective of this project was to define the electron beam irradiation conditions required to prepare thermally form stable high crystallinity polyethylene (HDPE) pellets which are suitable for thermal energy storage (TES) applications in the temperature interval of 120 exp 0 to 140 exp 0 C. The optimum material and conditions for electron beam x-linking via evaluation of thermal form stability and retained heat of fusion of HDPE pellets in a laboratory (5 lb) TES unit was defined. 250 pounds of crosslinked HDPE pellets under the optimum conditions defined in Task 1 were manufactured and evaluated for stability to extensive thermocycling in a pilot plant TES unit. Four different HDPE specimens were irradiated under different conditions of the total radiation dose received by the pellets, the electron beam accelerating potential, the electron beam current, the effect of inert atmospheres during irradiation processing, and the effect of stirring the HDPE pellets during the irradiation processing. The experimental values of the heat of fusion and the melting temperature of the irradiated HDPE pellets were measured and compared to the values of the as-received pellets to evaluate the effect of irradiation processing. The results showed that HDPE pellets irradiated to a dose of 8 megarads have sufficient thermal stability and retained heat of fusion to be used as TES material. The manufacture of 15,000 lb of cross linked HDPE pellets for large-scale evaluation TES material for home heating and cooling systems is recommended. (ERA citation 05:022474)

ORO-5217-6 PC **A03**/MF **A01**
Dow Chemical Co., Midland, MI.
Macro-Encapsulation of Heat Storage Phase-Change Materials for Use in Residential Buildings. Sixth Quarterly Progress Report, December 29, 1977-March 29, 1978.
G. A. Lane, G. L. Warner, P. B. Hartwick, and H. E. Rossow. May 78, 39p
Contract EY-76-C-05-5217

Objectives are to assess the feasibility of macro-encapsulated PCM's for residential solar systems and to develop and evaluate such materials. Encapsulant materials under consideration are multilayer flexible plastic films, steel cans, and plastic bottls. Studies of the storage capability of CaCl sub 2 6H sub 2 O encapsulated in polyethylene bottles and Mg(NO sub 3) sub 2 6H sub 2 O/NH sub 4 NO sub 3 eutectic, encapsulated in flexible plastic film packages. (ERA citation 05:022243)

PATENT-4 207 388 Not available NTIS
Department of the Air Force Washington DC
Copper (II) Chloride-Tetrachloroaluminate Battery.
Patent,
John K. Erbacher, Charles L. Hussey, and Lowell A. King. Filed 29 Nov 78, patented 10 Jun 80, 9p AD-D007 368/4, PAT-APPL-964 870
Supersedes PAT-APPL-964 870-78, AD-D006 819.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a pelletized, light weight, thermal battery having copper (II) chloride and an alkali tetrachloroaluminate as electrolytic components. (Author)

PB80-808645 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Battery Electrolytes. 1972-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Apr 80,
C. Gilbert Young. May 80, 68p
Sponsored in part by National Technical Information Service, Springfield, VA.

Many types of solid, liquid, and gaseous battery electrolytes are considered in the cited reports. Battery design, construction, and use, employing the listed electrolytes, are discussed. Battery life, efficiency, and maintenance characteristics are also delineated. (Contains 53 citations)

PB80-813363 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lead Batteries. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Diane M. Cavagnaro. Jul 80, 204p
Supersedes NTIS/PS-79/0780 and NTIS/PS-78/0689.

The design, development, components, fabrication, chemistry, and testing of lead batteries are cited in this compilation of Federally-funded research. Specific applications for spacecraft, consumer products, and electric vehicles are covered. Studies on lead recovery from battery scrap are covered. Several abstracts on lead toxicity in industrial plants are also cited. (This updated bibliography contains 199 citations, 36 of which are new entries to the previous edition.)

PB80-813371 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lead Batteries. 1977-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1977-Jun 80,
Diane M. Cavagnaro. Jul 80, 159p
Supersedes NTIS/PS-79/0782 and NTIS/PS-78/0690. See also NTIS/PS-79/0781.

Worldwide research on lead battery components, charging, corrosion, and testing is cited. The majority of studies concern battery use in electric vehicles. Studies on lead recovery from battery scrap and air pollution at battery factories are also included. (This updated bibliography contains 155 citations, 40 of which are new entries to the previous edition.)

UCID-18589 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Caustic Aluminate: Physical, Thermodynamic, and Transport Properties.
R. V. Homsy. 28 Mar 80, 21p
Contract W-7405-ENG-48

Experimental data in the literature on the physical, thermodynamic, and transport properties of caustic aluminate and its precipitate, hydrargillite, are summarized. An analytical expression for the vapor pressure of water over such solutions is derived. (ERA citation 05:022732)

UCRL-15225 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Comparison of Quasi-Isotropic Fiber Reinforced Composite Laminates.
J. C. Duke, Jr. Nov 79, 125p
Contract W-7405-ENG-48

Progress is reported on research on the mechanical properties of fiber-reinforced composite laminates which are candidate materials for flywheels. (ERA citation 05:022467)

11. MATERIALS

11A. Adhesives and Seals

N80-26449/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
High-Temperature Adhesives for Bonding Polyimide Film.
A. K. Stclair, W. S. Slemp, and T. L. Stclair. May 80, 28p NASA-TM-81824
Presented at the 23RD Natl. Sampe Symp., Anaheim, Calif., May 1978.

Experimental polyimide resins were developed and evaluated as potential high temperature adhesives for bonding Kapton polyimide film. Lap shear strengths of Kapton/Kapton bonds were obtained as a function of test temperature, adherend thickness, and long term aging at 575 K (575 F) in vacuum. Glass transition temperatures of the polyimide/'Kapton' bondlines were monitored by thermomechanical analysis.

N80-26450/0 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
A Fundamental Approach to Adhesion: Synthesis, Surface Analysis, Thermodynamics and Mechanics.
Semiannual Report.
B. Beck, R. Siriwardane, and J. P. Wightman. Jul 80, 19p NASA-CR-163024
Grant NSG-1124

Several techniques were used to study pretreated Ti 6-4 surfaces including scanning electron microscopy (SEM), electron spectroscopy of chemical analysis (ESCA), and, reflectance visible spectroscopy. Each pretreatment type gave a characteristic surface morphology as seen by SEM. Elemental analysis of the Ti 6-4 surfaces was done using ESCA. Trace residual contaminants from particular chemical pretreatments were identified readily. Results indicate that reflectance visible spectroscopy using indicator dyes placed on Ti 6-4 surfaces appears to be a feasible approach to establish surface acidity. Differences in surface acidity were observed using bromthymol blue on Ti 6-4 surfaces pretreated by two different methods.

PAT-APPL-6-154 725 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Hermetic Seal for a Shaft.
Patent Application,
F. Lombardi. Filed 30 May 80, 13p N80-25660/5, NASA-CASE-NPO-15115-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An hermetic seal for a linear rod with a portion projected axially through a port in a wall for a pressure chamber and supported for omnidirectional motion. The seal is characterized by a resilient, impervious, cylindrical body concentrically and integrally fixed to a shaft comprising a linear ordered array of annular flutes. A section integrally fixed to the wall of the chamber and concentrically related to the port comprises a second linear ordered array of annular flutes. A third section interposed between the first and second sections and integrally in coaxial alignment with them comprises an annular ordered array of linear flutes concentrically related to the shaft, which allows axial, angular, and pivoted motion of the rod.

PATENT-4 207 024 Not available NTIS
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Composite Seal for Turbomachinery.
Patent,
R. C. Bill, and L. P. Ludwig. Filed 4 Aug 78, patented 10 Jun 80, 4p N80-26658/8, PAT-APPL-931 090
Supersedes PAT-APPL-931 090-78, N78-31103 (16 - 22, p 2897).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A gas path seal suitable for use with a turbine engine or compressor is provided. A shroud wearable or abradable by the abrasion of the rotor blades of the turbine or compressor shrouds the rotor blades. A compliant backing surrounds the shroud. The backing is a compliant material covered with a thin ductile layer. A mounting fixture surrounds the backing.

11B. Ceramics, Refractories, and Glasses

AD-A085 874/6 PC **A06**/MF **A01**
Ceramic Finishing Co State College PA
Localized Impact Damage in Ceramics. Localized Impact Damage in Zinc Sulfide Crack Growth from Small Flaws in Larger Grains in Alumina.
Technical rept. no. 8, 1 Feb 79-31 Jan 80,

H. P. Kirchner, T. J. Larchuk, and J. M. Ragosta.
Feb 80, 104p
Contract N00014-74-C-0241

The following topics are covered in this report: (1) Localized impact damage in zinc sulfide, and (2) Crack growth from small flaws in larger grains in alumina. Zinc sulfide specimens were damaged by static and impact loading using glass spheres. The various types of cracks were identified and their sizes were measured. The maximum impact loads were estimated by several methods including an experimental method based on the assumption that static and impact loads are equal at equal indentation radii, a semi-empirical method previously developed on this program and a method suggested by Hutchings. Crack growth in alumina was simulated for the case of small flaws in larger surface crystals to determine the range of crystal sizes and loading rates in which single crystal fracture energies would be expected to control fracture. This should be expected only for large crystals and very high loading rates.

AD-A086 231/8 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center Watertown MA
Hot-Pressed Si3N4 with Improved Thermal Stability,
George E. Gazza, Heinrich Knoch, and George D. Quinn. 26 May 78, 11p Rept no. AMMRC-TR-80-22
Pub. in American Ceramic Society Bulletin, v57 n11 p1059-1060 Nov 78.

No abstract available.

PATENT-4 190 637
Not available NTIS
Department of Energy, Washington, DC.
Graphite Having Improved Thermal Stress Resistance and Method of Preparation.
Patent,
C. R. Kennedy. Filed 18 Jul 78, patented 26 Feb 80, 8p PAT-APPL-925 721
Supersedes PAT-APPL-925 721-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved method for fabricating a graphite article comprises the steps of impregnating a coke article by first heating the coke article in contact with a thermoplastic pitch at a temperature within the range of 250 to 300 exp 0 C at a pressure within the range of 200 to 2000 psig for at least 4 to 10 h and then heating at a temperature within the range of 450 to 485 exp 0 C at a pressure of 200 to 2000 psig for about 16 to 24 h to provide an impregnated article; heating the impregnated article for sufficient time to carbonize the impregnant to provide a second coke article, and graphitizing the second coke article. A graphite having improved thermal stress resistance results when the coke to be impregnated contains 1 to 3 wt % sulfur and no added puffing inhibitors. An additional improvement in thermal stress resistance is achieved when the second coke article is heated above about 1400 exp 0 C at a rate of at least 10 exp 0 C/minute to a temperature above the puffing temperature. (ERA citation 05:026168)

11C. Coating, Colorants, and Finishes

PATENT-4 200 669
Not available NTIS
Department of the Navy Washington DC
Laser Spraying.
Patent,
Robert J. Schaefer, and Jack D. Ayers. Filed 22 Nov 78, patented 29 Apr 80, 7p AD-D007 347/8, PAT-APPL-962 855
Supersedes PAT-APPL-962 855-78, AD-D005 674.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and apparatus for spraying a surface which comprises: introducing into a laser beam, a powder with the a vapor pressure from 10 to the minus 2 power to 10 to the minus 1 power atm. in excess of the ambient pressure at a temperature up to about 500 C. above the melting point thereof and with a heat-absorption coefficient from 0.2 to 1; and passing the laser beam over said surface. Since the method and apparatus can coat or alloy or dope a surface, a wide variety of protective coatings can be fabricated. (Author)

PB80-813421 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical Vapor Deposition. 1975-1978 (Citations from the NTIS Data Base).
Rept. for 1975-78,
Diane M. Cavagnaro. Jul 80, 251p

This bibliography discusses chemical vapor deposition of carbon, carbides, ceramics, metals, and glasses. Applications of this process include coatings, semiconducting films, laser materials, solar cells, composite fabrication, and nuclear reactor material fabrication. The physical, mechanical, and chemical properties of these coatings are covered. (This updated bibliography contains 246 citations, none of which are new entries to the previous edition.)

PB80-813439 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chemical Vapor Deposition. 1979-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jun 80,
Diane M. Cavagnaro. Jul 80, 69p
Supersedes NTIS/PS-79/0739 and NTIS/PS-78/0691. See also 1964-1974, NTIS/PS-76/0521.

Research on chemical vapor deposition of carbon, carbides, ceramics, metals, and glasses are cited. Applications of this process include optical coatings, semiconducting films, laser materials, solar cells, composite fabrication, and nuclear reactor material fabrication. The physical, mechanical, and chemical properties of these coatings are covered. (This updated bibliography contains 64 citations, 50 of which are new entries to the previous edition.)

SAND-80-0596 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Metallographic Preparation of Titanium Diboride Coatings.
M. E. McAllaster. Mar 80, 12p
Contract EY-76-C-04-0789

A method is described for preparing metallographic cross sections of thin, hard, chemically vapor deposited titanium diboride coatings on various softer substrates. Standard metallographic preparation techniques were found to result in fracturing and edge rounding of the coatings. It is shown that these problems can be avoided by unidirectional grinding on worn 600 grit silicon carbide abrasive paper. Typical photomicrographs of chemically vapor deposited titanium diboride coatings are shown along with photomicrographs of intermediate phases that form at the titanium diboride - substrate interfaces. (ERA citation 05:022718)

11D. Composite Materials

AD-A085 853/0 PC **A03**/MF **A01**
General Electric Co Cincinnati OH Aircraft Engine Group
Metal Matrix Composite Bonding Characteristics and Impact Properties.
Final rept. 1 Mar 77-29 Feb 80,
Robert G. Carlson. 30 Apr 80, 47p R80AEG345, AFOSR-TR-80-0453
Contract F49620-77-C-0067

This research program objective is to develop an understanding of the surface characteristics and bond behavior in metal matrix composites as related to the impact properties. The initial part of this program addresses itself to bonding of aluminum foils with different surface treatments. Scanning electron micrographs revealed the presence of A1/Fe compounds. Following this, extensive efforts were directed at identifying an etchant to remove such heterogeneous phase identified to be an aluminum iron compound, Al3Fe. After an extensive literature review, three chemical etchants were selected, the aluminum alloy foils were chemically tested, and the etched foils were evaluated by scanning electron microscopy. Single layered monotapes were then formed and evaluated by bond integrity testing (BIT). Following this, further studies were performed on evaluation of hybrid metal/metal foil combinations consisting of aluminum alloy foils against titanium or stainless steel foils. The study was next directed at fabrication of single-ply boron/aluminum panels and then in formation of hybrid titanium/aluminum/boron (TAB) and stainless steel/aluminum/boron (SAB) single-ply panels.

AD-A085 858/9 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Failure Analysis of Composite Laminates with a Fastener Hole.
Final rept. 15 Sep 78-1 Aug 79,
Som R. Soni. Mar 80, 50p Rept no. AFWAL-TR-80-4010

Stress and strength analysis of composite laminates with a through the thickness circular hole, under uniaxial tensile load has been conducted. The hole is filled with a rigid core simulating a bolt. As a representation of the force at the bolted joint, displacement boundary conditions are applied to the rigid core. The stress analysis is based on treating the laminate as a homogeneous plate using finite element technique. The strength analysis is based on the tensor polynomial failure criterion applied to each constituent ply orientations. The ultimate laminate failure strength is based on the last ply failure stress. The resulting predictions of strength are found to be conservative as compared to experimental values. (Author)

AD-A085 859/7 MF **A01**
Dayton Univ OH Research Inst
Quick Reaction Evaluation of Materials for Systems Applications.
Final technical rept. 3 Jan 78-31 Mar 80,
D. R. Askins, R. R. Cervay, D. L. Hart, and B. H. Wilt. Apr 80, 371p UDR-TR-80-12, AFWAL-TR-80-4025
Contract F33615-78-C-5002
Availability: Microfiche copies only.

This report is divided into four sections summarizing the engineering studies completed under contract to the Air Force Wright Aeronautical Laboratories, Materials Support Division. A variety of materials evaluations were completed under the categories of Alloys and Composites, Electronic Failure Analysis, Elastomers, and Plastics, Adhesives, and Composites. (Author)

AD-A085 878/7 PC **A02**/MF **A01**
Queen Mary Coll London (England) Dept of Materials
Environmental Failure of Adhesive Bonding in Composites.
Annual rept. no. 1 (Final), Sep 78-Dec 79,
E. H. Andrews, Ho Ping Sheng, H. A. Majid, and C. Viachos. Mar 80, 21p
Grant DA-ERO-78-G-118

The adaptation of the Andrews-Stevenson (A-S) adhesion test, previously used for epoxy to metal adhesive systems, for epoxy-to-glass bonds has been achieved for epoxy resins having relatively low T sub g's (e.g. Epikote 828, T sub g = 71 C). Partial success has been achieved for high T sub g resins (e.g. SP250). This adaptation has required considerable sophistication of test-piece geometry to prevent thermal contraction stresses shattering the glass substrates during specimen preparation. The effect of water immersion at 80 C for various periods of time has been studied for the system Epikote 828 pyrex glass in the absence of coupling agents. The fracture mode becomes increasingly cohesive as immersion time increases and the peak in the curve of fracture energy versus crack speed falls progressively. Using Andrews' generalized theory, the adhesive fracture energy theta can be separated into its interfacial energy and dissipative components.

AD-A085 995/9 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia Dept of Materials Science and Engineering
Reduction of Elastic Moduli of Fiber Composites by Fatigue Crack Accumulation.
Technical rept.,

T. Gottesman, Z. Hashin, and M. A. Brull. 15 Apr 80, 18p Rept no. TR-4
Contract N00014-78-C-0544

The problem of reduction of elastic moduli of unidirectional fiber composites due to parallel cracks, either parallel or normal to fibers, is considered on the basis of variational techniques. Expressions for effective elastic moduli are given for the case of a small number of non-interacting cracks. It is shown that these are upper bounds on effective elastic moduli for the case of arbitrary distributions of parallel cracks. Lower bounds for Young's moduli for special parallel crack distributions are also constructed. In addition, the 'self consistent scheme' approximation is also applied to the present problem. The problem treated is of significance for fatigue damage of fiber composites since such damage consists primarily of formation of such cracks. Experimental determination of moduli reduction due to cyclic stress (wearout) can thus provide a measure of the number of cracks formed. (Author)

AD-A086 149/2 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Molecular Composites - Rodlike Polymer Reinforcing and Amorphous Polymer Matrix.
Final rept. Oct 78-Jun 79,
G. Husman, T. Helminiak, M. Wellman, and W. Adams. May 80, 35p Rept no. AFWAL-TR-80-4034

The concept of molecular composites utilizing rodlike aromatic heterocyclic polymers as reinforcements in coil-like heterocyclic polymer matrices has been demonstrated. A series of polymer films, prepared by vacuum casting from various solutions of rod-like polymer, amorphous polymer, and solvent, were fabricated and tested. Morphological studies of these films were conducted using x-ray diffraction and scanning electron microscopy. The results of the morphology studies showed pronounced structure and definite evidence of the ordering of the rod-like polymer. In some cases, a second phase or conglomeration was evidenced. Analysis of the scanning electron microscopy pictures indicated that the second phase was itself a composite of rod-like and amorphous polymer. The mechanical testing showed significant increases in tensile modulus and strength with only ten percent rod-like polymer in the matrix; this was especially true after stretching of the film had been performed. Analytical equations developed for composite materials were used to calculate theoretical properties of the conglomerates and rods. All results and conclusions are presented in detail in this report. (Author)

AD-A086 165/8 PC **A05**/MF **A01**
Atomic Energy Research Establishment Harwell (England) Non-Destructive Testing Centre
Nondestructive Examination of Composite Materials - A survey of European Literature.
Final technical rept. Oct 79-Feb 80,
William N. Reynolds. May 80, 89p
Contract DAJA37-79-C-0553

The references corresponding to the nondestructive examination of fibre reinforced composite materials have been retrieved from the Harwell NDT Centre information system and all those relating to European work have been examined. This has produced a comprehensive list of techniques used and of institutions and companies which have so far played an active part in the field. Apart from the relatively few industries which have met the need to develop testing procedures for composite materials in production or use, a much larger number of universities and research organizations have carried out fundamental studies of the problems involved which enable some calculations to be drawn about the outstanding difficulties. These include some useful reviews of the subject. In addition, samples of composite materials have been included in some general testing programmes, and references to a number of these are included. (Author)

AD-A086 211/0 PC **A04**/MF **A01**
Effects Technology Inc Santa Barbara CA
TWCP Electron Beam Testing Program. Volume I. Summary.
Final rept. Jul 77-Dec 78,
F. A. Bick. 5 Apr 79, 72p ETI-CR-79-610-VOL-1, DNA-5036F-1, AD-E300 816
Contract DNA001-78-C-0063
See also Volume 4, Ad-A086 214.

Volume I of four volumes. Summarizes the results of a series of electron beam tests that: (1) characterized the Maxwell Laboratory's Blackjack III pulsed electron beam facility for material response studies related to nuclear weapons effects on reentry vehicle heat-shield materials; (2) developed a set of instrumentation to diagnose the electron beam environment and measure material response as to impulse and stress generation; and (3) generated impulse and stress data on FM5822A carbon phenolic and 91-LD phenolic resin materials. The data generated demonstrated the utility of the Blackjack III facility and will be used in a separate program entitled, 'TWCP Correlation Program.' The instrumentation developed are applicable to these types of tests on a variety of facilities. The environmental diagnostical instrumentation achieved a significant reduction in experimental uncertainties when compared to prior techniques. This program was conducted within the framework of the Nuclear Hardness Evaluation Procedures Program and the concepts developed therein. (Author)

AD-A086 214/4 PC **A07**/MF **A01**
Effects Technology Inc Santa Barbara CA
TWCP Electron Beam Testing Program. Volume IV. TWCP Electron Beam Tests.
Final rept. Jul 77-Dec 78,
F. A. Bick. 5 Apr 79, 134p ETI-CR-79-610-VOL-4, DNA-5036F-4, AD-E300 815
Contracts DNA001-76-C-0357, DNA001-78-C-0063
See also Volume 1, AD-A086 211.

This volume presents impulse and stress generation data on FM5822A tape wrapped carbon phenolic and 91-LD phenolic resin using the techniques described in Volumes II and III. Preliminary data analysis is presented, however, the final utility of these data is to be determined through the 'TWCP Correlation Program.' Data were generated at a peak electron energy of approximately 1-MeV and at fluence levels ranging from approximately 70 to 120 cal/sq cm. By a unique in situ diagnostical technique, the experimental errors associated with the beam parameters (fluence, peak dose) were approximately halved when compared with prior test programs for this type of facility.

N80-26396/5 PC **A11**/MF **A01**
Rocketdyne, Canoga Park, CA.
Development and Demonstration of Manufacturing Processes for Fabricating Graphite/LARC-160 Polyimide Structural Elements, Part 4, Paragraph B.
Quarterly Progress Report, 16 Dec. 1979 - 15 Mar. 1980.
15 Mar 80, 248p NASA-CR-159303, QPR-7-PT-4
Contract NAS1-15371

A quality assurance program was developed which included specifications for celion/LARC-160 polyimide materials and quality control of materials and processes. The effects of monomers and/or polymer variables and prepeg variables on the processibility of celion/LARC prepeg were included. Processes for fabricating laminates, honeycomb core panels, and chopped fiber moldings were developed. Specimens and conduct tests were fabricated to qualify the processes for fabrication of demonstration components.

N80-26397/3 PC **A07**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Thermal Cycling Graphite-Polyimide.
M. W. Hyer, and J. A. Hagaman. Apr 79, 134p
NASA-CR-163294, VPI-E-79-115
Grant NSG-1167

The effects of repetitive thermal cycling on the temperature-thermal deformation relation of graphite-polyimide were determined. The bending and axial strains, measured with strain gages, of unsymmetric 0 deg sub 2/90 deg sub 2 and 0 deg sub 4/90 deg sub 4 laminates were used as an indication of thermal deformation. The strains were measured as a function of temperature and two temperature ranges were used, room temperature to 180 C and room temperature to 315 C. Five cycles were run in each temperature range and the cycling was done in quasistatic fasion. The response of a flat 0 deg sub 8 laminate was measured as were the effects of repetitive cycling on the strain gages themselves. A piece-wise linear theory, based on classical lamination theory and using the variation of mechanical and thermal expansion properties with temperature, was compared with the experimental results. The correlation between theoretical predictions and experimental results for the thinner laminate was poor.

N80-26398/1 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
The Structural Behavior of a Graphite-Polymide Honeycomb Sandwich Panel with Quasi-Isotropic Face Sheets and an Orthotropic Core.
M. W. Hyer, and J. A. Hagaman. Jun 79, 124p
NASA-CR-163297, VPI-E-79-23
Grant NSG-1167

The results of a series of tests of graphite-polyimide honeycomb sandwich panels are presented. The panels were 1.22 m long, 0.508 m wide, and approximately 13.3 m thick. The face sheets were a T-300/PMR-15 fabric in a quasi-isotropic layup and were 0.279 mm thick. The core was Hexcel HRH 327-3/16 - 4.0 glass reinforced polyimide honeycomb, 12.7 mm thick. Three panels were used in the test: one was cut into smaller pieces for testing as beam, compression, and shear specimens; a second panel was used for plate bending tests; the third panel was used for in-plane stability tests. Presented are the experimental results of four point bending tests, short block compression tests, core transverse shear modulus, three point bending tests, vibration tests, plate bending tests, and panel stability tests. The results of the first three tests are used to predict the results of some of the other tests. The predictions and experimental results are compared, and the agreement is quite good.

N80-26400/5 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Mass Loss of a TEOS-Coated, Reinforced Carbon-Carbon Composite Subjected to a Simulted Shuttle Entry Environment.
C. W. Stroud, and D. R. Rummler. Jul 80, 62p
NASA-TM-81799, L-13400

Coated, reinforced carbon-carbon (RCC) is used for the leading edges of the space shuttle. The mass loss characteristics of RCC specimens coated with tetraethyl orthosilicate (TEOS) were determine for conditions which simulated the environment expected at the lug attachment area of the leading edge. Mission simulation included simultaneous application of load, temperature, and oxygen partial pressure. Maximum specimen temperature was 900 K (1160 F). Specimens were exposed for up to 80 simulated missions. Stress levels up to 6.8 MPa (980 psi) did not significantly affect the mass loss characteristics of the TEOS-coated RCC material. Mass loss was correlated with the bulk density of the specimens.

N80-26404/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France).
On the Production of Composite Materials Produire en Composite.
M. G. Jube. 1979, 25p SNIAS-792-502-103
Text in French.

The properties, advantages and disadvantages of composite materials are presented. The suppliers of these materials are given, together with the different ways in which they are fabricated and later employed. The problems encountered with these materials are discussed. The specific materials manufactured by various companies are described together with their characteristics. Design features, calculation principles and certification procedures are reviewed together with cost considerations. Aeronautic and other applications in the United States and European countries are presented.

PAT-APPL-6-161 254 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
A Silicon-Slurry/Aluminide Coating.
Patent Application,
D. L. Deadmore, and S. G. Young. Filed 20 Jun 80, 11p N80-26389/0, NASA-CASE-LEW-13343-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low cost coating is disclosed which protects metallic base system substrates from high temperatures, high gas velocity oxidation, thermal fatigue and hot corrosion. The coating is particularly useful for protecting vanes and blades in aircraft and land based gas turbine engines. A lacquer slurry comprising cellulose nitrate containing high purity silicon powder is sprayed onto the superalloy substrates. The silicon layer is then aluminized to complete the coating. The Si-Al coating is less costly to produce than advanced aluminides and protects the substrate from oxidation and thermal fatigue for a much longer period of time than the conventional aluminide coatings. While more expensive Pt-Al coatings and physical vapor deposited MCrALY coatings on certain superalloys in high gas velocity oxidation and thermal fatigue. Also, the Si-Al coating increased the resistance of certain superalloys to hot corrosion.

PATENT-4 204 899 Not available NTIS
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Cork-Resin Ablative Insulation for Complex Surfaces and Method for Applying the Same.
Patent,
H. M. Walker, M. H. Sharpe, and W. G. Simpson. Filed 12 Sep 78, patented 27 May 80, 3p N80-26388/2, PAT-APPL-941 711
Supersedes PAT-APPL-941 711-78, N78-32190 (16-23, p 3052).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method of applying cork-resin ablative insulation material to complex curved surfaces is disclosed. The material is prepared by mixing finely divided cork with a B-stage curable thermosetting resin, forming the resulting mixture into a block, B-stage curing the resin-containing block, and slicing the block into sheets. The B-stage cured sheet is shaped to conform to the surface being insulated, and further curing is then performed. Curing of the resins only to B-stage before shaping enables application of sheet material to complex curved surfaces and avoids limitations and disadvantages presented in handling of fully cured sheet material.

11E. Fibers and Textiles

AD-A085 849/8 PC **A02**/MF **A01**
Dayton Univ OH Research Inst
The Surface Composition and Energetics of Type HM Graphite Fibers.
Technical rept. Apr 77-Dec 78,
L. T. Drzal, J. A. Mescher, and D. L. Hall. 27 Dec 78, 16p AFWAL-TR-80-4030
Contract F33615-76-C-5185
Pub. in Carbon, v17 n5A p375-382 1979.

No abstract available.

PAT-APPL-6-061 152 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
One-Directional Uniformly Coated Fibers, Method of Preparation, and Uses Therefor.
Patent Application,
L. R. Newkirk, F. A. Valencia, R. E. Riley, and T. C. Wallace, Sr. Filed 26 Jul 79, 32p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A problem addressed by this invention was how to obtain very long lengths of refractory metal-coated multifilamentary yarns having a uniform coating on the filaments which make up each yarn, the coating being uniform throughout the length of the yarn such that the coated yarns are suitable for being woven and are suitable for a variety of other uses. The solution is a continuous process which employs a chemical vapor deposition reaction at relatively low temperature and pressure and a separation of the gaseous reaction products from the coated yarn prior to allowing the coated yarn to cool. (ERA citation 05:026156)

PAT-APPL-6-146 546 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Wrinkle-Resistance and Durable-Press Cotton-Containing Fabric by Treatment with Acrylamide and Glyoxal.
Patent Application,
John G. Frick, Jr., and Robert J. Harper, Jr. Filed 5 May 80, 10p PB80-198179
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Cotton, or other fabric containing cellulose, is treated with acrylamide and a chemical initiator that promotes reaction of acrylamide with cellulose. The fabric, with bound acrylamide, is then treated with glyoxal and an acidic, metal salt catalyst to produce a fabric containing crosslinked cellulose. Thus, the fabric is given wrinkle resistance and durable-press properties by the treatment without using formaldehyde, free or combined, that could be released during treatment or from the treated fabric.

11F. Metallurgy and Metallography

AAEC/E-462 PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Creep Properties at Ambient Temperature of Some High Strength Steels.
J. T. A. Pollock, and S. G. Barton. Mar 79, 28p
U.S. Sales Only.

Little information is available on the long-term mechanical properties of high strength steels at ambient temperatures. In particular, creep characteristics are virtually unknown and difficult to estimate from simple tensile tests in which very little deformation may be exhibited before fracture. Most room temperature applications of high strength steels do not require prior knowledge of creep properties. It is assumed that up to 80 per cent ultimate tensile stress (UTS) no creep occurs. However, there are applications in which dimensional stability during operation is of such importance that any creep occurring under applied load could be critical. Therefore, the magnitude of this creep must be known and taken into account during design. Gas centrifuges for the enrichment of uranium represent such an application. The current work has as a primary goal, the generation of relevant design information. A secondary aim is to make pertinent suggestions for improvements in desired properties. (Atomindex citation 11:499232)

AD-A085 882/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Monitoring Metastable Phases and Grain Structures Derived from Glassy Alloys.
Technical rept. Oct 78-Jan 80,
Ken-Sue Tan, Thomas Wahl, and Roy Kaplow. 24 Mar 80, 13p Rept no. TR-4
Contract N00014-76-C-0171, Grant NSF-DMR78-24185

The glassy phase affords a potentially unique route to achieving new metastable structures with desirable properties. X-ray diffraction, Mossbauer spectroscopy and electron microscopy studies of iron-base alloys show a number of potentially useful (and perhaps generally characteristic) behaviors in the transition from the as-quenched glass towards equilibrium, such as relaxed glassy states, supersaturated solid solutions, unique metastable compounds and phase morphologies, and ultrafine grain sizes. (Author)

AD-A085 883/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Austenitic Grain Growth Characteristics in Rapidly Solidified Martensitic Steels.
Technical rept. Oct 78-Jan 80,
M. Suga, J. L. Goss, G. B. Olson, and J. B. Vander Sande. 25 Mar 80, 10p Rept no. TR-5

Comparison of the austenitic grain growth characteristics of conventionally processed and rapidly solidified 9Ni-4Co and 2Mo steels has revealed an unusual resistance to grain coarsening of the rapidly solidified material. At 1200 C where the conventionally processed material coarsens to a grain size of several hundred microns, the rapidly solidified material retains a grain size of approximately 20 micrometers. The morphological characteristics of the inhibited grain growth indicate strong pinning at prior powder particle boundaries. Long-time austenitizing treatments at 1100-1200 C eventually lead to discontinuous coarsening. Evidence so far suggests that the unusual coarsening resistance may be due to finely distributed sulfides. It is anticipated that high austenitizing treatment of rapidly solidified steels will allow improvement of sharp-crack fracture toughness (K sub IC) without the loss of Charpy energy and tensile ductility associated with excessive grain coarsening; exploitation of this phenomenon, however, will require an extreme level of cleanliness in powder processing. (Author)

AD-A085 887/8 MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Materials Science and Engineering
A Stem Analysis of Two Rapidly Solidified Stainless Steels.
Technical rept. no. 6, Oct 78-Jan 80,
T. F. Kelly, and J. B. Vander Sande. 25 Mar 80, 14p
Contract N00014-76-C-0171
Availability: Microfiche copies only.

Scanning transmission electron microscopy (STEM) has been used for microstructural and microchemical analysis of two rapidly solidified austenitic stainless steels. One steel is a high-sulfur, 303 stainless type. In this rapidly solidified steel, sulfide particles (MnS) are found to be two or three orders of magnitude smaller in size, and more uniformly distributed, than in the conventionally processed material. Extremely small sulfide particles have been observed at the cell walls and in the intracellular region of the solidification structure of individual rapidly solidified powder particles. Moreover, composition profiles have been obtained by the STEM across regular and nonregular cell walls in these powders which indicate that a high degree of chemical homogeneity has obtained. A comparison is made of the microstructures and microchemistry of individual powders, consolidated powder product, and conventionally processed versions of this high-sulfur austenitic stainless steel. The rapidly solidified powders of a high-phosphorus stainless steel have also been observed in STEM. The results of these observations are presented in light of the data obtained on the high-sulfur steel. (Author)

AD-A085 892/8 PC **A04**/MF **A01**
Terra Tek Inc Salt Lake City UT
Evaluation of a New Fracture Toughness Measuring Technique, and Adaptation of the Technique to Use Ultra-Small Specimens.
Final rept.,
Lynn M. Barker. Sep 79, 54p AMMRC-TR-79-53
Contract DAAG46-78-C-0040

Three separate investigations were undertaken to determine the applicability of the short rod fracture toughness measurement method to materials such as HF1 fragmentation steel, which is of particular interest to the Army. In the first study, short rod fracture toughness (K sub ic SR) measurements were compared with ASTM E 399 measurements of toughness (K sub Ic) in a number of metallic materials. Very good agreement was found. In the second study, the methods of fabricating and testing ultra-small short rod specimens (6.35 mm diameter) were developed and used in measurements of HF1 material taken from actual shell casings. The agreement of the ultrasmall short rod measurements with the toughness as measured by precracked charpy specimens of the same material was rather poor. The third study was made to determine the sensitivity of the short rod toughness measurement to the size of the specimen used in the test. Short rods of various sizes of 4340 steel and two heat treatments of HF1 steel were tested. The specimen size independence of the 4340 steel was marginal, but it was excellent for the HF1 steel. A trend toward an increasing scatter in K sub IC SR data with decreasing specimen size

was noted. Recommendations for decreasing the data scatter and automating the test are made. (Author)

AD-A085 998/3 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Metallurgy and Materials Science
Status Report for Period 1 November 1970 to 30 April 1980.
30 Apr 80, 10p
Contract N00014-75-C-0265

This report summarizes our progress on two current areas of investigation: The use of strengthening particles as innocuous hydrogen traps and hydrogen-induced twin formation in iron-titanium alloys.

AD-A086 000/7 PC **A08**/MF **A01**
National Materials Advisory Board (Nas-Nae) Washington DC
Amorphous and Metastable Microcrystalline Rapidly Solidified Alloys: Status and Potential.
Final rept.,
Nicholas J. Grant, Carl F. Cline, Lance A. Davis, Bernard H. Kear, and Fred E. Luborsky. May 80, 170p Rept no. NMAB-358
Contract MDA903-78-C-0038

The nature, properties, processing, and possible applications of two classes of materials are described: amorphous solids, particularly glassy metals, and metastable microcrystalline alloys. The thermodynamics and structural considerations of both amorphous and metastable metals and nonmetals are discussed in detail. The chemistry and properties of systems for which data are available also are described as are the processing limitations and methods. Application possibilities are discussed, and the report concludes with recommendations for research and development. (Author)

AD-A086 021/3 MF **A01**
Metcut Research Associates Inc Cincinnati OH
Critically Loaded Hole Technology Advisory Group for Aerospace Research and Development.
Final rept. 27 Dec 77-27 Oct 79,
John B. Kohls, Stephen C. Ford, and George Roth. Mar 80, 136p 970-26000-1, AFWAL-TR-80-4027
Contract F33615-78-C-5030
Prepared in cooperation with Battelle-Columbus Labs., OH and Dayton Univ. Research Inst., OH. Availability: Microfiche copies only.

A pilot test program was conducted which consisted of a coordinated test activity between interested AGARD SMP member countries. The program leads to a more uniform attitude toward fatigue testing and evaluation of critically loaded hole parameters among its participants. This report describes the U.S. portion of the test program. The report includes both open hole and low load transfer joint testing of specimens having both high and low quality test holes. The quality level of the holes was based primarily on cost. The report also includes a technique for verifying the loading accuracy of the spectrum fatigue equipment used by each of the participants. (author)

AD-A086 150/0 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Stress Corrosion Resistance of 7010-T73651.
Progress rept.,
L. A. Biggs. 16 Apr 80, 13p Rept no. NADC-80038-60

7010-T73651 Aluminum Alloy was compared to 7050-T73651 in stress corrosion and exfoliation tests. Results of a 30 day alternate immersion test in 3 1/2 percent NaCl indicate that 7010-T73651 has a threshold stress of 35 ksi (240 MPa) and is resistant to exfoliation. The threshold stress for cracking of the 7050-T73651 was 45 ksi (310 MPa). (Author)

AD-A086 257/3 PC **A03**/MF **A01**
Drexel Univ Philadelphia PA Coll of Engineering
Melt Purification via Filtration.
Interim rept.,
D. Apelian, R. Mutharasan, and C. Romanowski. Apr 80, 34p AMMRC-TR-80-16
Contract DAAG46-79-C-0052

Background on the mechanisms and kinetics of filtration is discussed and the model proposed by Drexel is elaborated. An apparatus for dapth filtration of molten aluminium has been developed and the results of the experiments to date are analyzed. The apparatus under construction for steel filtration is described and the envisaged method of experimentation is discussed. Reference is made to proposed future work on a low temperature model system and to further studies of aluminium filtration. (Author)

BARC-994 PC **A06**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Annual Report of the Metallurgy Division (For the) Period Ending December 1977.
K. Elayaperumal, Ch. Sridhar Rao, P. Mukhopadhyay, and S. V. K. Rao. 1979, 106p
U.S. Sales Only.

The research and development work carried out and the various programmes underway in the Metallurgy Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1977 have been reported. The R and D work and programmes cover extraction metallurgy, physical metallurgy, alloy development, corrosion metallurgy and ceramics. Some of the major studies and programmes are: (1) development of processes for extraction of niobium, vanadium, hafnium and nickel, (2) preparation of niobium alloys, ferro-zirconium, ceramic grade zirconia, (3) electro-refining of zircaloy scrap, (4) preparation of anhydrous beryllium fluoride from Indian beryl, (5) preparation of beryllium alloys, (6) studies on phase transformation and deformation behaviour of zirconium and zirconium-oxygen alloys, (7) self-diffusion studies in dilute Zr-Fe and Zr-Cr alloys, (8) studies on corrosion and stress corrosion cracking of zirconium base alloys and (9) sintering studies on ZrO sub 2 - PuO sub 2 and BeO. (Atomindex citation 11:501966)

BDX-613-2378 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Pulse Plating of Nickel Deposits.
C. J. Stimetz, and M. F. Stevenson. Feb 80, 17p
CONF-800621-1
Contract EY-76-C-04-0613
67. annual AES technical conference, Milwaukee, WI, USA, 22 Jun 1980.

Pulse plated and conventional nickel deposits have been compared for differences in morphology, mechanical properties, and microstructure. The deposits were obtained from nickel sulfamate, nickel chloride, and Watts nickel plating solutions. No significant differences were found in the direct and pulse current deposits from the sulfamate and chloride solutions; however, significant differences in microstructure, yield strength, and microhardness were observed in deposits from the Watts nickel solution. (ERA citation 05:022639)

CEA-CONF-4498 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Optical Microscopic Observation of Texture Anisotropy on Zirconium and Its Alloys.
L. Chamagne. 1978, 19p
In French.
U.S. Sales Only. Microfiche copies only.

A study of the polarization variation produced by hexagonal metals, especially zirconium and its alloys, when the sample is turned in a plane perpendicular to the light beam illuminating it revealed a link between the texture of the sample and the shape of the curves obtained by measuring the light it reflects during rotation. The first part of this work was carried out on oriented monocrystals. The angle for which the maximum appears is shown to be directly related to the angle between the crystallographic C axis and the normal to the measurement plane. It is therefore possible to define the position of the C axis in the crystal. The second part is the practical application to polycrystalline materials deformed by rolling. Though calculations on the shape of the curves are out of the question for the moment it is easy to compare shapes obtained under well-defined conditions. Examples: - metal treated in the beta form and cooled at controlled speed; - sample laminated in 2 directions and having a similar isotropy in both; - influence of a 100% lamination, one of the two directions being taken for reference. These curves show that a manufacture can be followed and modified as requested by the customer. In addition the method requires no specialised technicians and the apparatus can be fitted to all microscopes possessing polarised light. (Atomindex citation 11:499182)

CEA-CONF-4543 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. d'Etudes des Combustibles a Base de Plutonium.
Radiation Effects in Metals.
J. Leteurtre. 1978, 29p
NATO summer school, Aleria, France, 10 - 23 Sep 1978.
U.S. Sales Only.

The current understanding of radiation damage in metals is reviewed, simplifying the actual complexity of the effects by considering some aspects separately. The production of point defects in metals, the primary damage state are first studied. The second part of the lecture is devoted to the evolution of this primary damage state as a function of temperature and dose: the steady state concentration of point defects, the nucleation of secondary defects and their growth are successively considered. (Atomindex citation 11:499345)

CEGB-RD/B/N-4618 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Metallographic Examination of Structural Degradation During Creep-Fatigue.
R. Hales. Jul 79, 22p
U.S. Sales Only.

A series of specimens of T316 stainless steel, which had been tested under creep-fatigue conditions, was examined by optical and scanning electron microscopy. The development of cavities which are associated with grain-boundary carbide precipitates has been recorded. These cavities increase in size and number with increasing hold time at peak tensile strain and cause the propagating fatigue crack to follow an intergranular path. At a strain range of +- 0.25% the dominant damage mechanism is due to creep damage when the tensile hold time is greater than one minute. The fatigue crack which causes final failure is nucleated at a stress raiser and it is possible that in a smooth specimen failure may occur without the nucleation of a fatigue crack at all but rather by ductile shearing. (Atomindex citation 11:502021)

CONF-791112-61 PC **A02**/MF **A01**
Vanderbilt Univ., Nashville, TN.
Electrochemical Behavior of Titanium Implanted with Platinum.
N. G. Thompson, B. D. Lichter, B. R. Appleton, E. J. Kelly, and C. W. White. 1979, 16p
Contract W-7405-ENG-26
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The following conclusions apply to Ti(Pt) near-surface alloys studied. (1) Open-circuit corrosion measurements show that accumulation of platinum may occur at a surface concentration of 0.32 atomic percent Pt while no accumulation occurs at 0.16 atomic percent Pt. However, these results do not allow a distinction as to cause of accumulation to be made between concentration effects and effects due to the presence of an oxide film. (2) Potentiostatic corrosion at -0.450 V (active corrosion) establish that little or no accumulation of platinum occurs at an oxide-free surface for concentrations less than 0.086 atomic percent Pt; whereas, a large amount of accumulation occurs for a distribution with a peak concentration of 0.83 atomic percent Pt. (3) An initial distribution having a peak concentration of 0.32 atomic percent platinum is sufficient to induce natural passivity in titanium and bring a freely corroding sample to a potential of 0.269 V. This is nearly the applicable reversible potential (-0.260 V) for the hydrogen reaction in 1N H sub 2 SO sub 4 . (4) Of three samples which showed accumulation, platinum was eventually lost for two of these samples (0.32 atomic percent, open-circuit corrosion; 0.83 atomic percent, potentiostatic corrosion). The remaining sample (9.1

atomic percent, open-circuit corrosion) maintained the maximum possible potential of -0.260 V for the length of the experiment (approx. 30 days). (5) For samples which had been polarized at -0.300 to -0.340 V and which had eventually reverted to the behavior of pure Ti, post corrosion RBS measurements reveal that a substantial fraction of the Pt fluence is retained on the surface in an electrochemically inactive state. (ERA citation 05:022679)

CONF-800401-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Corrosion in Lithium-Stainless Steel Thermal-Convection Systems.
P. F. Tortorelli, J. H. DeVan, and J. E. Selle.
1980, 22p
Contract W-7405-ENG-26
International conference of liquid metal technology for energy systems, Richland, WA, USA, 20 Apr 1980.

The corrosion of types 304L and 316 austenitic stainless steel by flowing lithium was studied in thermal-convection loops operated at 500 to 650 exp 0 C. Both weight and compositional changes were measured on specimens distributed throughout each loop and were combined with metallographic examinations to evaluate the corrosion processes. The corrosion rate and mass transfer characteristics did not significantly differ between the two austenitic stainless steels. Addition of 500 or 1700 wt ppM N to purified lithium did not increase the dissolution rate or change the attack mode of type 316 stainless steel. Adding 5 wt % Al to the lithium reduced the weight loss of this steel by a factor of 5 relative to a pure lithium-thermal-convection loop. (ERA citation 05:022680)

COO-3084-75 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Effect of Alloy Deformation on the Average Spacing Parameters of Non-Deforming Particles.
J. Fisher, and J. Gurland. Feb 80, 16p
Contract AC02-80ER10556

It is shown on the basis of stereological definitions and a few simple experiments that the commonly used average dispersion parameters, area fraction (A/sub A/)/sub beta /, areal particle density N/sub A beta / and mean free path lambda/sub alpha /, remain invariant during plastic deformation in the case of non-deforming equiaxed particles. Directional effects on the spacing parameters N/sub A beta / and lambda/sub alpha / arise during uniaxial deformation by rotation and preferred orientation of nonequiaxed particles. Particle arrangement in stringered or layered structures and the effect of deformation on nearest neighbor distances of particles and voids are briefly discussed in relation to strength and fracture theories. (ERA citation 05:022655)

COO-3084/76 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Dept. of Engineering.
Comparison of Experiment and Theory for Elastic-Plastic Plane Strain Crack Growth.
L. Hermann, and J. R. Rice. Feb 80, 39p CONF-800358-1
Contract EY-76-S-02-3084
Conference on micromechanisms of crack extension, Cambridge, UK, 31 Mar 1980.

Recent theoretical results on elastic-plastic plane strain crack growth, and experimental results for crack growth in a 4140 steel in terms of the theoretical concepts are reviewed. The theory is based on a recent asymptotic analysis of crack surface opening and strain distributions at a quasi-statically advancing crack tip in an ideally-plastic solid. The analysis is incomplete in that some of the parameters which appear in it are known only approximately, especially at large scale yielding. Nevertheless, it suffices to derive a relation between the imposed loading and amount of crack growth, prior to general yielding, based on the assumption that a geometrically similar near-tip crack profile is maintained during growth. The resulting predictions for the variation of J with crack growth are found to fit well to the experimental results obtained on deeply cracked compact specimens. (ERA citation 05:022656)

COO-3084/77 PC **A09**/MF **A01**
Brown Univ., Providence, RI.
Void Nucleation in Spheroidized Steels During Tensile Deformation.
J. R. Fisher, Jr. Apr 80, 193p
Contract EY-76-S-02-3084

An investigation was conducted to determine the effects of various mechanical and material parameters on void formation at cementite particles in axisymmetric tensile specimens of spheroidized plain carbon steels. Desired microstructures for each of three steel types were obtained. Observations of void morphology with respect to various microstructural features were made using optical and scanning electron microscopy. (ERA citation 05:022657)

DOE/ER/10367-2 PC **A05**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Manufacture of Superconducting Wire. Progress Report, February 1-October 15, 1979.
B. Avitzur, Y. T. Chou, S. Talbert, and R. Wu. Oct 79, 81p
Contract AC02-79ER10367

This report is divided into three major sections. The first section covers aspects of the manufacturing technology with existing and potential processes, and the second deals with the analysis of flow and fracture and the derivation of criteria to prevent failure. In the first section, typical present day procedure to assemble a billet, extrude and draw it, with intermediate and final anneals, is described. Then an hypothetical production line with potential alternative processes along the entire path from heavy billet to fine wire, is laid out. Several processes at different stages of development, are offered, with the message that their potential must be explored for the development of more reliable product, at a more economical production cost. In the second section the analysis of core fracture and its prevention during the process of drawing is provided. Treatment of velocity fields for a bi-metallic rod leads to the determination of criteria for the prevention of fracture. The criteria are presented graphically. The third section of the report describes work on micro properties of superconducting wires. A modification of the bronze method for niobium-tin superconductors is proposed and a preliminary schedule of the testing procedures is outlined. (ERA citation 05:022640)

ECN-73 PC **A03**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Tensile Properties of Irradiated and Fatigue Exposed Stainless Steel DIN X 6 CrNi 1811 (Similar to AISI Type 304) Plate and Welded Joints.
M. I. de Vries, B. van der Schaaf, and J. D. Elen. Oct 79, 49p
U.S. Sales Only.

Test specimens of plate metal and welded joints of stainless steel DIN 1.4948, which is similar to AISI type 304, have been irradiated at 723 exp 0 K and 823 exp 0 K up to fluences of 1.10 exp 23 n.m exp -2 and 5.10 exp 24 n.m exp -2 (E > 0.1 MeV). These are representative conditions for the SNR-300 reactor vessel and inner components after 16 years of operation. High-rate (depsilon/dt = 1 s exp -1) tensile tests were performed after fatigue exposure up to various fractions of fatigue life (D) ranging from 5% to 95% at the same temperatures as the nominal temperatures of the irradiation series. (Atomindex citation 11:502189)

EGG-RE-M-78-024 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Corrosion of 316, 316L and 321 Stainless Steels in Static Molten Lithium.
P. V. Kelsey, Jr., G. A. Reimann, and R. K. Malik. Sep 78, 31p
Contract EY-76-C-07-1570

U-bend specimens of Types 316, 316L and 321 stainless steel with 20, 50 and 90% cold work were exposed to static lithium at 811 exp 0 K (1000 exp 0 F) for 2500 hours. The depth of attack in all specimens was less than 13 mu m (0.005 in.). The trend of increased attack with an increase in cold work (20 to 50%) is anomalously reversed by further cold working (50 to 90%). The stress induced by the U-bend configuration was relieved during exposure. Alonized specimens of the above materials tested in a similar manner were virtually unaffected. (ERA citation 05:022682)

INIS-mf-5293 PC **A03**/MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Self-Diffusion Process in Liquid Metals and Alloys by the Radioactive Tracer Method.
L. Ganovici. 1978, 29p
In Romanian.Thesis.
U.S. Sales Only.

A theoretical and experimental study of self-diffusion process in liquid metals and alloys is presented. There are only a few pure metals for which diffusion coefficients in a liquid state are known. The thesis aims at increasing the number of liquid metals for which diffusion coefficients are available, by determining these values for liquids: Cd, Tl, Sb and Te. The self-diffusion coefficients of Te in some tellurium based liquid alloys such as Tl sub 2 Te, PbTe and Bi sub 90 Te sub 10 were also determined. Self-diffusion coefficients have been measured using two radioactive tracer methods: (a) the capillary-reservoir method and (b) the semi-infinite capillary method. The self-diffusion coefficients were derived from the measured radioactive concentration profile, using the solutions of Fick's second law for appropriate initial and limit conditions. The temperature dependence study of self-diffusion coefficients in liquids Cd, Tl, Sb and Te, was used to check some theoretical models on the diffusion mechanism in metallic melts. The experimental diffusion data interpreted in terms of the Arrhenius type temperature dependence, was used to propose two simple empiric relations for determining self diffusion coefficients of group I liquid metals and for liquid semi-metals. It was established a marked decrease of self-diffusion coefficients of liquid Te close to the solidification temperature. The diffusivity of Te in liquid Tl sub 2 Te points to an important decrease close to the solidification temperature. A simplified model was proposed for the diffusion structural unit in this alloy and the hard sphere model for liquid metals was checked by comparing the theoretical and experimental self-diffusion coefficients. (Atomindex citation 11:499197)

LBL-10128 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Consequences of the Re-Transformation of Precipitated Austenite in Ferritic Cryogenic Steels. Technical Report No. 8.
J. W. Morris, Jr., C. K. Syn, J. I. Kim, and B. Fultz. Jun 79, 12p CONF-7906103-4
Contract W-7405-ENG-48
International conference on martensitic transformation, Boston, MA, USA, 24 Jun 1979.

The re-transformation of precipitated austenite (gamma /sub R/) in Fe-(6-9)%Ni steels has been investigated, with particular emphasis on the influence of transformation characteristics on alloy toughness at cryogenic temperature. In all cases studied the precipitated austenite re-transforms, either during cooling to cryogenic temperature or during deformation prior to fracture of the alloy. When the re-transformation is thermally induced the product martensite tends to form in a variant identical to that present before precipitation of the austenite; no significant refinement of the microstructure is achieved. On the other hand, mechanical transformation of the austenite produces a distribution of martensite variants determined by the local strain, hence preserving a refined microstructure conducive to low temperature toughness. (ERA citation 05:022648)

MLM-2707(OP) MF **A01**
Mound Facility, Miamisburg, OH.
Nickel-Iron Alloy Corrosion in a Sealed Pyrotechnic System.
E. E. Tibbitts, and R. F. Salerno. 1980, 22p
CONF-800713-2
Contract AC04-76DP00053
International pyrotechnics seminar, Vail, CO, USA, 14 Jul 1980.
Microfiche copies only.

Actuators loaded with Ti/KClO sub 4 and aged for several days had chlorine-containing corrosion products on Alloy-52 electrode pins and Tophet-C bridgewire surfaces. An in-depth analysis of these materials indicated that moisture, organic contamination, and chlorine were the major causes of the corrosion. Definite evidence was uncovered that indicated a partial decomposition of the KClO sub

4 was the major source of the chlorine. In the presence of moisture, particles that settle on the metal surface cause the formation of galvanic or oxygen concentration cells that dissolve to produce electrolytes on the metal surface causing corrosion of the metal. Corrosion can be eliminated by reducing the humidity to below a critical level and vacuum drying the pyrotechnic so that no moisture is condensed on the metal. Since water is consumed in the reaction forming hydrated oxides or hydroxides, the extent of the reaction is limited by the amount of water in the sealed unit. Therefore, in unsealed, undesiccated assemblies, corrosion would probably continue with the rate varying with the ambient humidity. Since effective cleaning of the header and dry conditions are the key factors in eliminating the corrosion, honing, polishing, and passivating the metal surfaces provide added corrosion protection. (ERA citation 05:024413)

N80-26387/4 PC **A08**/MF **A01**
Vacuumschmelze G.m.b.H., Hanau (Germany, F. R.).
Development of Soft Magnetic Materials with Special Properties.
Final Report.
A. Mager. Oct 79, 167p BMFT-FB-T-79-32
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Results on the influence of crystal grains, inclusions, and mechanical stresses on the soft magnetic properties of Ni-Fe alloys are given. Soft magnetic alloys were developed and improved for low temperature applications, for small temperature coefficients, for different shapes of hysteresis loops, and for high wear resistance.

N80-26390/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Further Development and Application of Polycrystalline Metal Whiskers.
H. J. Schladitz. Dec 79, 61p NASA-TM-75745, BMFT-FB-T-76-18
Contract NASW-3198
Transl. Into English of Weiterentwicklung und Anwendung von Polykristallinen Metallwhiskern (Bonn), Final Report, Bmft-FB-T-76-18, Jun. 1976 75 p. Translation Was Announced as N77-12219. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Bundesministerium fuer Forsch. Und Technol., Bonn.

High strength metal whiskers have a larger versatile field of application than monocrystalline whiskers. Although polycrystalline metal whiskers can be used for composites, preferably by extrusion in thermoplastics or by infiltration of resins or metals into whisker networks, the chief application at present may be the production and various use of whisker networks. Such networks can be produced up to high degrees of porosity and besides high mechanical strength, they have high inside surfaces and high electric conductivity. There are for instance, applications concerning construction of electrodes for batteries and fuel cells, catalysts and also new heat-exchanger material, capable of preparing fuel oil and gasoline in order to assist a high-efficiency combustion. The technical application of polycrystalline metal whiskers require their modification as well as the construction of a pilot production unit.

N80-26427/8 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.
Hot Corrosion of Co-Cr, Co-Cr-Al, and Ni-Cr Alloys in the Temperature Range of 700-750 Deg C.
Semiannual Report, 1 Sep. 1979 - 29 Feb. 1980.
K. T. Chiang, and G. H. Meier. Jun 80, 29p
NASA-CR-159689, SAR-3
Grant NSG-3214

The effect of SO3 pressure in the gas phase on the Na2SO4 induced hot corrosion of Co-Cr, Ni-Cr, and Co-Cr-Al alloys was studied in the temperature range 700 to 750 C. The degradation of the Co-Cr and Ni-Cr alloys was found to be associated with the formation of liquid mixed sulfates (CoSO4-Na2SO4 or NiSO4-Na2SO4) which provided a selective dissolution of the Co or Ni and a subsequent sulfidation oxidation mode of attack which prevented the maintenance of a protective Cr2O3 film. A clear mechanism was not developed for the degradation of Co-Cr-Al alloys. A pitting corrosion morphology was induced by a number of different mechanisms.

N80-26444/3 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Heat Treatment of Light Aeronautic Alloys: Developments in Residual Stress Studies le Traitement Thermique des Alliages Legers Aeronautiques. Developpement de l'Aspect. Contraintes Residuelles.
J. Odorico. 23 Jun 79, 9p SNIAS-792-551-101
Text in French. Presented at Assoc. Tech. De Traitement Thermique Conf., Tarbes, France, 3 Jun. 1978.

The specific case of alloy 7075 in the T73 state was studied. The effect of quenching water temperature on its mechanical characteristics at 20/25 C was investigated. Plastic deformation taking place between quenching and tempering was studied; for certain simply shaped parts, this effect can considerably reduce stress. For more complex parts a deliberately introduced deformation between quenching and tempering may reduce stresses as may a modification in cooling rates.

N80-26704/0 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France).
Experimental Methodology and the Application of Rupture Mechanics Concepts to Metals.
J. Odorico. 1979, 22p SNIAS-792-551-109
Text in French; English Summary. Presented at 14TH. Congr. Intern. Aeron., Paris, 6-8 Jun. 1979.

Standard metal testing procedures are reviewed, including ASTM tests for aluminum alloys. The use of data from these tests is discussed in terms of minimizing costs and enhancement of safety. Results from tests concerning the parameters K sub Ic, curve R, da/dN, and da/dt are presented.

PAT-APPL-6-160 050 PC **A02**/MF **A01**
Department of the Navy Washington DC
Melting Method for High-Homogeneity Precise-Composition Nickel-Titanium Alloys.
Patent Application,
David Goldstein, and Scott Hoover. Filed 16 Jun 80, 9p AD-D007 299/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a method of producing homogeneous nickel-titanium base shape change memory alloys which includes the following steps in order: converting a conventionally prepared nickel-titanium base shape change memory alloy into particles which are in the form of powder, shot, chips, or flakes; blending or mixing the nickel-titanium base alloy particles; melting the nickel-titanium base alloy particles; and allowing the molten nickel-titanium base alloy to solidify into a desired shape. (Author)

PATENT-4 183 744
Not available NTIS
Department of Energy, Washington, DC.
Method of Foaming a Liquid Metal.
Patent,
A. K. Fischer, and C. E. Johnson. Filed 28 Jul 78, patented 15 Jan 80, 4p PAT-APPL-929 144
Supersedes PAT-APPL-929 144-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The addition of a small quantity of barium to liquid metal NaK or sodium has been found to promote foam formation and improve bubble retention in the liquid metal. A stable liquid metal foam will provide a more homogeneous liquid metal flow through the channel of a two-phase liquid metal MHD power generator to improve operating efficiency. (ERA citation 05:026016)

PATENT-4 196 055
Not available NTIS
Department of the Navy Washington DC
Method of Determining the Presence of Stray Electrical Currents in a Solution.
Patent,
Thomas J. Lennox, Jr. Filed 25 Aug 75, patented 1 Apr 80, 5p AD-D007 340/3, PAT-APPL-607 528
Supersedes PAT-APPL-607 528-75, AD-D001 958.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system and method of detecting stray electrical currents that cause corrosion on metallic structures submerged in electrolytic media. The system makes use of a plurality of metal plates in an arrangement so they will be bipolar electrodes in a stray current field and the stray currents are determined by the color of the plates. The amount of stray currents are determined by the amount of metal loss over a period of time. Plates may be placed about a ship's hull, or other submerged structures, or suspended in an open area of solution to locate areas of stray currents. (Author)

PB80-808868 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cryogenic Aging of Metals. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 116p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the deterioration, or failure, of metals at low temperatures. Aluminum is not included, as it is the subject of a separate retrospective bibliography. Cryogenic operations, superconductors, aircraft, arctic facilities and other forms of exposure of metals to extreme cold, are included. Failure mechanisms, dynamics, and inhibitors or retardants, are described. (Contains 104 citations)

PB80-808876 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cryogenic Aging of Metals. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 134p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the deterioration, or failure, of metals at low temperatures. Aluminum is not included, as it is the subject of a separate retrospective bibliography. Cryogenic operations, superconductors, aircraft, arctic facilities and other forms of exposure of metals to extreme cold, are included. Failure mechanisms, dynamics, and inhibitors or retardants, are described. (Contains 132 citations)

PB80-808884 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cryogenic Aging of Metals. 1975-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1975-Apr 80,
C. Gilbert Young. May 80, 130p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations discuss the deterioration, or failure, of metals at low temperatures. Aluminum is not included, as it is the subject of a separate retrospective bibliography. Cryogenic operations, superconductors, aircraft, arctic facilities and other forms of exposure of metals to extreme cold, are included. Failure mechanisms, dynamics, and inhibitors or retardants, are described. (Contains 137 citations)

RISO-M-2124 PC **A02**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Fracture Mechanics - Current Status, Future Prospects.
B. Lebech, and P. Bak. 29 Jul 78, 7p CONF-780867-2
11. congress of crystallography, Warsaw, Poland, 3 Aug 1978.
U.S. Sales Only.

The magnetic structure of Nd was determined by combining the results of neutron diffraction studies with the results of Landau symmetry arguments and renormalization group theory. The incipient magnetic order is a two-dimensional, incommensurably modulated structure ('triple-q(vec)' structure). The ordering is accompanied by a lattice distortion that forms a similar pattern. The modulation vector decreases from slightly above 1/7 b sub 1 (unit vec) at Tsub(N) to 1/8 b sub 1 (unit vec) at approximately 10 K. The moments at the hexagonal sites lie in the basal plane while those at the cubic sites lie predominantly along the hexagonal axis. The size of the moments on the cubic sites is approximately 25% of that of the moments on the hexagonal sites, with a ratio of three between the moment components along the hexagonal axis and those in the basal plane. (Atomindex citation 11:502040)

UCID-18600(Pt.2) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Hot Hollow Cathode Control System Upgrade Proposal.
J. A. Arluck, and J. L. Walling. 23 Jan 80, 17p
Contract W-7405-ENG-48

The hot hollow cathode (HHC) coating process is used to produce highly adherent coatings for solid state bonding. It is a very complex multi-step coating process requiring constant operator attention and input for periods up to one hour. To insure that good coatings have been produced, the levels of many process parameters must be recorded. In September 1979 a proposal for an upgraded control system and data logger was made. This is a description of the engineering design of that control system. The overall control scheme, the equipment to be used, a representative sample of some of the programming, cost estimates, and a proposed schedule for bringing the system on line are described. (ERA citation 05:022644)

11H. Oils, Lubricants, and Hydraulic Fluids

PATENT-4 032 441
Not available NTIS
Department of the Air Force Washington DC
Method for Reclaiming Used Hydraulic Fluid.
Patent,
G. Eugene Larkin, and Richard H. Buchi. Filed 30 Jun 76, patented 28 Jun 77, 5p AD-D007 366/8, PAT-APPL-701 280
Supersedes PAT-APPL-701 280-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is described for reclaiming used, petroleum base, aircraft operational hydraulic fluids by a method which includes the sequential steps of settling, aerating, foam inhibiting, adding of only supplemental amounts of additive agents and fine particle filtering.

11I. Plastics

AD-A086 148/4 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Synthesis and Properties of Acetylene Terminated Sulfone (ATS).
Final rept. Apr 77-Apr 79,
G. A. Loughran, and Fred E. Arnold. Mar 80, 34p
Rept no. AFWAL-TR-80-4011

The utilization of acetylene end-groups on phenylquinoxaline oligomers has provided a wide variety of new and improved matrix resins. The cured thermoset quinoxaline systems exhibit excellent moisture resistance which demonstrated the moisture insensitivity of the polyene product of the acetylene cure reaction. In an effort to use this technology in systems which process and handle like current state-of-the-art epoxies, the thermoset system 4,4'-bis(3-ethynylphenoxy)diphenylsulfone (ATS) was synthesized for characterization and evaluation as 350 F matrix system. Thermal analytical data obtained on ATS indicated a Tg at 0 C and a strong polymerization exotherm maximizing at 240 C. Cured ATS samples exhibited excellent thermal oxidative properties as evidenced by isothermal aging in air at 500 F and 600 F. Synthetic routes to ATS are included as well as physical properties of the system before/after cure. (Author)

AD-A086 199/7 PC **A02**/MF **A01**
Massachusetts Univ Amherst Dept of Polymer Science and Engineering
Effect of Structure on Physical Properties of Polymers.
Final rept. 1 Jan 76-31 Dec 79,
Frank E. Karasz. 31 Dec 79, 22p AFOSR-TR-80-0475
Grant AFOSR-76-2983

The overall objective of this research program has been to investigate the physical nature of macromolecular systems as a function of the chemical and stereochemical structure of the macromolecule. A potential improvement in important facets of polymer properties was an underlying premise in the design and execution of the research. The work performed included investigations of the behavior of polymers in solution, as well as in the solid state and was accompanied by a program of theoretical studies to complement the experimental work. One focus of the research was the area of polymer-polymer interactions in binary blends, in which factors influencing compatibility, i.e., mutual solubility, were systematically investigated by a number of thermodynamic techniques. Heats of polymer mixing were obtained for selected systems and shown to be useful in predicting phase behavior otherwise obscured by non-equilibrium effects. The latter were also investigated theoretically in studies of the effect of domain size and composition on glass transition temperatures and allied phenomena. Another area of research concerned the physical properties of model epoxy network systems, and in particular, the effect of water on these properties. A characteristic of crosslinked polymers is their ready plasticization by relatively small amounts of low molecular weight materials and the basis of this observation has been explained on a thermodynamic basis. Solution properties of polymers were studied by means of quasi-elastic light scattering.

AD-A086 200/3 PC **A04**/MF **A01**
Naples Univ (Italy) Dept of Chemical Engineering
Effect of Applied Stress, Thermal Environment and Water in Epoxy Resins.
Interim rept. 1 Jul 78-30 Nov 79,
L. Nicolais, E. Drioli, and A. Apicella. Nov 79, 54p
AFOSR-TR-80-0474
Grant AFOSR-77-3369

Because of their elevated physical properties, epoxy resins are widely used as matrices for high performance composites. However, due to moisture induced plasticization and formation of microcavities, high temperature and humidity tend to reduce their physical properties. A history dependent solubility model is generalized in accordance with the Dual Mode Sorption theory to account for effective water diffusion coefficients based on microcavitational damage brought about by temperature and moisture. Laboratory testing for weight changes in sorption-description experiments have been accomplished using a McBain quartz-spring microbalance placed in a temperature and humidity controlled cell. Equilibrium moisture absorption levels were represented both by linear and upward isotherms depending upon the humidity history. Analysis of sorption data, using a transport model in which part of the diffusing molecules are completely immobilized in the formed microcavities, revealed the damaging process to be in agreement with the diffusion coefficient depressions and solubility increases predicted by the model. A crazing criterion is qualitatively used to test the nature of the damaging process. (Author)

BDX-613-2399 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Stress Relaxation of Cellular Silicone Material.
J. W. Schneider. May 80, 18p
Contract AC04-76DP00613

Stress relaxation information for cellular silicone materials formed with urea leachable filler is being gathered. Two types of polymers are used in the test: equilibrium type (random copolymer) and condensation type (block copolymer). Each of these was compounded to provide finished materials with nominal apparent densities of 0.34 and 0.52 g/cm exp 3. Three sample variations of 1.17, 1.52, and 2.54 mm nominal thickness were prepared from the lower density product, and two sample variations higher density product. Each of the material/thickness combinations was compressed to nominal compressions of 20 and 40% with nine replicates at each condition. A compression fixture for aging is used to maintain a specific compression on the cellular sample at room temperature, and a test machine is used to acquire the load data. The load was recorded at initial assembly and at selected times thereafter. A total of 180 specimens are in test, 90 equilibrium type material samples that have been stored 4 years and 90 condensation type material samples that have been stored for 3 years. Each condition for each material type has nine replicates. Of these nine samples, two are 3 year controls, two more are 10 year controls, and five are tested regularly. Current data supports the statement that the time dependent loss of load bearing properties is approximately log-linear, with the major differences found to be between the material types and the two densities of each material type. Extrapolation indicates that at the end of the planned 10-year study, the load retention of all samples will be between 58 and 68% of original; the condensation type material is expected to be superior. (ERA citation 05:024445)

DOE/BC/00047-9 PC **A06**/MF **A01**
New Mexico Petroleum Recovery Research Center, Socorro.
Development of Improved Mobility Control Agents for Surfactant/Polymer Flooding. First Annual Report, September 29, 1978-September 30, 1979.
F. D. Martin. May 80, 113p
Contract EW-78-C-19-0047

Phase 1: Based on a literature survey and input solicited from industry, academic, and government sources, inadequacies of the currently used mobility control materials were assessed. Phase 2: Baseline screening of commercially available polymers began in January 1979. Rheological measurements and mobility control test in Berea cores have been completed on Dow Pusher 700, Betz Hi Vis, Nalco Nal-flo, Cyanamid 960S, Kelco Xanflood, and Abbott Xanthan Broth. Similar tests were completed for Pusher 500, Pusher 1000, Amoco Sweepaid 103, and Pfizer Flocon Biopolymer 1035. Shear degradation tests in Berea core plugs have been completed for one acrylamide-type polymer and one xanthan polymer in 0.3% NaCl. Similar tests in 3% NaCl plus 0.3% CaCl sub 2 are in progress. Viscosity and screen factor data have been collected for most of the commercially available polymers. Long-term thermal stability tests with one polyacrylamide polymer and one xanthan polymer have been initiated. Phase 3: The polymer synthesis phase of the program is in progress. A series of N-alkyl (N-methyl, N-isopropyl, and N-butyl) acrylamide homopolymers and copolymers with acrylic acid has been synthesized. Variations of the substituents on the acrylamide nitrogen atom did not substantially change the properties of the parent compound. Increasing the molecular weight tends to impart increased shear sensitivity. Degree of hydrolysis also affects performance of the modified polymer. 25 figures, 40 tables. (ERA citation 05:021759)

N80-26458/3 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Use of High Performance Polymers in the Aerospace Industry Utilisation des Polymers Performants dans l'Aerospatiale.
J. P. Bentejac. 10 Aug 79, 10p SNIAS-792-551-104
Text in French. Presented at Symp. Sur les Polymers a Hautes Performances et Leurs Appl. Recentes, 7 Nov. 1978.

The applicability of polymers to various fabricated parts and structures is discussed from both the technical and financial point of view. The factors determining the choice of materials are reviewed together with the evolution in such materials over recent years. A table is given showing the interdependance between mechanical and thermal characteristics, various behavior properties, economic

parameters and specific applications. The different characteristics and applications (aircraft, ballistics missiles, helicopters, etc.) of the various different thermosetting plastics are described.

PAT-APPL-6-161 253 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Low Temperature Cross Linking Polyimides.
Patent Application,
T. T. Serafini, and P. Delviss. Filed 20 Jun 80, 14p N80-26447/6, NASA-CASE-LEW-12876-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A way of forming a prepolymer polyimide which can be cross-linked at a relatively low temperature is disclosed. Usually a polyimide is formed by cross linking a prepolymer formed by reacting a polyfunctional ester, a polyfunctional amine, and an end-capping unit. By providing a styrene derivative end-capping unit, the prepolymer is curable at a temperature of about 175 to 245 C.

PAT-APPL-6-163 838 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Preparation of Perfluorinated 1,2,4-Oxadiazoles.
Patent Application,
R. H. Kratzer, K. J. L. Paciorek, T. I. Ito, and R. W. Rosser. Filed 27 Jun 80, 9p N80-26407/0, NASA-CASE-ARC-11267-2
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of preparing fluorinated alkyl or alkylether 1,2,4-oxadiazoles is disclosed. The oxadiazoles are synthesized by cyclizing the corresponding alkyl or alkylether imidoylamidoximes in vacuo or in an inert atmosphere at a temperature within the range of 40 to 100 C for a period of 8 to 144 hours in the presence of an acid compound which can accept ammonia to form a salt. The imidoylamidoximes usable in this process may be either polymeric or nonpolymeric. As a result of the low cyclization temperatures, the quality and quantity of the 1,2,4-oxadiazole polymers are better than other disclosed processes.

PAT-APPL-6-163 839 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Preparation of Perfluorinated Imidoylamidoximes.
Patent Application,
R. H. Kratzer, K. J. L. Paciorek, T. I. Ito, and R. W. Rosser. Filed 27 Jun 80, 8p N80-26386/6, NASA-CASE-ARC-11267-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of preparing perfluorinated imidoylamidoximes is disclosed. The imidoylamidoximes are synthesized by the condensation of a perfluorinated nitrile with a perfluorinated amidoxime in vacuo or in an inert atmosphere at a temperature within the range of about 20 to 70 C for a period of 24 to 240 hours. When both the nitrile and the amidoxime reactants are difunctional, oligomeric or polymeric product are obtained, which, after cyclization of the imidoylamidoxime groups to 1,2,4-oxadiazole linkages, yield excellent heat, chemical, and solvent resistant elastomers.

PATENT-4 207 407 Not available NTIS
Department of the Air Force Washington DC
Aromatic Heterocyclic Polymer Alloys and Products Produced Therefrom.
Patent,
Thaddeus E. Helminiak, Charles L. Benner, Fred E. Arnold, and George E. Husman. Filed 3 May 78, patented 10 Jun 80, 7p AD-D007 369/2, PAT-APPL-902 525
Supersedes PAT-APPL-902 525-78, AD-D005 084.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Rod-like aromatic heterocyclic polymers are used as reinforcement in coil-like heterocyclic polymer matrices to provide composites at the molecular level that are analogous to chopped fiber composites. (Author)

PB80-813454 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Polycarbonates: Properties, Synthesis, and Applications. 1977-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jun 80,
Diane M. Cavagnaro. Jul 80, 110p
Supersedes NTIS/PS-79/0790 and NTIS/PS-78/0754. See also 1964-1976, NTIS/PS-79/0789.

The bibliography cites Government sponsored research reports on synthesis, properties, and uses of polycarbonate resins. The physical, mechanical, and chemical behavior of polycarbonates are covered, as well as processing and manufacturing techniques. (This updated bibliography contains 103 citations, 29 of which are new entries to the previous edition.)

11L. Wood and Paper Products

AD-A086 073/4 PC **A99**/MF **A01**
Forest Products Lab Madison WI
Tropical Timbers of the World,
Martin Chudnoff. Apr 80, 829p

Over the past two decades U.S. lumber imports from the tropics have increased fourfold. Plywood trade, mostly from Asian sources, has soared forty-fold and now equals our domestic production. Log imports, though, have decreased drastically from about 100 million board feet (log scale) in the 1950's to 30 million currently. Much of the world timber trade now is in the form of processed material. Many more tropical wood species and species groupings are being made available to U.S. processors. Most of these have been well known for many years on the European markets. This interest in supplemental supplies from overseas is in both softwoods and hardwoods. An extensive foreign literature has described the properties and uses of tropical woods, but much of it is no longer readily available. In this country the U.S. Forest Products Laboratory, over the years, issued 'Information Leaflets' or 'Foreign Wood Series' reports on some species of importance. But many of these are now out of print. The most recent comprehensive document, 'Properties of Imported Tropical Woods,' contained a description of about 100 tropical genera.

PB80-195829 PC **A07**/MF **A01**
Washington Univ., Seattle. Coll. of Forest Resources.
Chemicals from Western Hardwoods and Agricultural Residues.
Semi-annual rept.
15 Apr 80, 131p NSF/RA-800066
Grants NSF-PFR80-02050, NSF-PFR77-08979
See also report dated 15 Oct 79, PB80-118474.

This report describes methods of delignification and characterization of by-product lignins and conversion processes of biomass components to chemical feedstocks. Results of kinetic and model studies are reported. A better understanding of the organosolv delignification process was obtained. Exploratory work on organosolv delignification using ammonium sulfide as a catalyst has led to the discovery of an exceptionally selective delignification system, resulting in near-quantitative recovery of the polysaccharides in the pulp. For both cottonwood and bagasse, the lignin-free pulp yields exceed by 11 to 12 percent the yields of conventional kraft and soda pulps at low kappa levels. Furthermore, the tensile strength of the pulp obtained from cottonwood was higher after beating than that of the corresponding kraft pulp. The ammonium sulfide-catalyzed organosolv process has substantial interest for industrial application. This method allows for the facile recovery of both ethanol and ammonium sulfide by simple distillation. Simultaneously, the dissolved lignin precipitates in a filterable form. The average molecular weight of this lignin appears to be lower than those of organosolv lignins previously isolated. Thus, lignin obtainable from this process has promising feedstock properties and is presently being characterized. Average molecular weights for a number of organosolv lignins were determined. Results of work in the following areas are presented: the potential of lignins in polymeric applications; microwave degradation of biomass and lignins; and hydrocracking in tetralin.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A085 831/6 PC **A02**/MF **A01**
Brown Univ Providence RI
An Averaging Method for Stochastic Approximations with Constant Parameters: Small Parameter Values,
H. J. Kushner. Mar 80, 24p
Contract N00014-76-C-0279, Grant AFOSR-77-3063
Sponsored in part by grant NSF-ENG77-12946.

Stochastic approximations with constant gain coefficients and dependent noise and nonlinear or even 'discontinuous dynamics' have many applications in control, automata and communication theory. When the gain coefficient is small, an asymptotic theory is developed which gives much information on the character of the paths and errors. The method involves both 'averaging' and 'stability' ideas. The ideas are outlined. An example which illustrates the basic ideas and techniques is given. (Author)

AD-A085 885/2 PC **A02**/MF **A01**
Yale Univ New Haven CT Dept of Statistics
Tests for Joint Normality in Time Series.
Technical rept.,
Francis J. Anscombe, and Ho-len H. Chang. May 80, 13p Rept no. Tr-47
Contract N00014-75-C-0563

The well-known methods for analysis of time series, whether in the time domain or in the frequency domain -- for fitting parametric structures, for regression, for forecasting -- all involve second-moment statistics. If all variables are jointly normally distributed in stationary sequences, simple first and second moments contain all the information. If not, there is the possibility that some of the needed information is not contained in the statistics used. When a random sequence is other than stationary and jointly normal, it may sometimes equally well be described and thought of as stationary but not jointly normal (which is the terminology used here) or as nonstationary.

AD-A085 898/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Algorithms for Computing Apparent Speed,
A. P. Tkachenko. 20 May 80, 9p Rept no. FTD-ID(RS)T-0754-80
Edited trans. of Kibernetika i Vychislitel'naya Tekhnika (USSR) n8 p142-146 1971, by Martin J. Folan.

No abstract available.

AD-A085 981/9 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Dept of Mathematics
A Finite Element Method for First Order Hyperbolic Systems.
Interim rept.,
Mitchell Luskin. 1980, 47p AFOSR-TR-80-0427
Contract F49620-79-C-0149

A new finite element method is proposed for the numerical solution of a class of initial-boundary value problems for first order hyperbolic systems in one space dimension. An application of our procedure to a system modeling gas flow in a pipe is discussed. Asymptotic error estimates are derived in the L sq norm in space. (Author)

AD-A086 094/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Confidence Bounds for the Linear Model of Less than the Full Rank with an Introduction to G-Inverses.
Technical rept.,
Kali S. Banerjee. May 80, 31p ARBRL-TR-02241, AD-E430 459

This paper explains the use of Scheffe's theorem on simultaneous confidence bounds in the context

of linear hypothesis model of less than the full rank. In paving the background, some results on the uniqueness of estimates in the theory of singular designs are brought together in a compact form in this report with a brief explanatory introduction to the solution of linear equations as related to the computation of a g-inverse.

AD-A086 103/9 PC **A03**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Shape Segmentation Using Arc/Chord Properties.
Technical rept.,
W. S. Rutkowski. Dec 79, 35p Rept no. TR-849
Contract DAAG53-76-C-0138, DARPA Order-3206

This report investigates a class of shape segmentation methods in which, for each arc of the shape's contour, we consider the region bounded by the arc and its chord; compute a simple geometrical property of this region; and choose arcs for which this property's value is a local extremum. The characteristics of this approach are analyzed for several such properties, and examples of the segmentations obtained in this way are given. It is concluded that such methods will sometimes yield results that are not perceptually plausible. (Author)

AD-A086 114/6 PC **A03**/MF **A01**
North Carolina Univ At Chapel Hill
Antithetic Variates Revisited.
Technical rept.,
George S. Fishman, and BaoSheng D. Huang.
Jun 80, 40p Rept no. TR-80-4
Contract N00014-76-C-0302

This paper extends earlier results in the area of variance reduction techniques applied to simulation on a computer. In particular, it views the antithetic sampling technique as a combination of rotation and reflection sampling on a circle. The covariance structures induced by the techniques separately and together are derived and conditions under which they are optimal sampling plans are described. Rates of convergence for the variance of the sample mean are given for bounded, continuous and discrete random variables and for unbounded continuous random variables with special, although commonly encountered, structure. (Author)

AD-A086 192/2 PC **A02**/MF **A01**
Maryland Univ College Park Computer Science Center
The Behavior of a Multiplicity Independent Root-Finding Scheme in the Presence of Error.
Technical rept.,
G. W. Stewart. Apr 80, 8p Rept no. TR-890
Contract N00014-76-C-0391

A derivative free scheme has been proposed that permits root finding methods, such as the secant method to perserve high order convergence when the root in question is multiple. In this note it is shown that the scheme can fail to achieve the maximum accuracy that is attainable at a fixed precision of computation.

AD-A086 193/0 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Computer Science
Computable Error Bounds for Aggregated Markov Chains.
Technical rept.,
G. W. Stewart. May 80, 33p Rept no. TR-901
Contract N00014-76-C-0391

This paper describes a method for computing the steady state probability vector of a nearly completely decomposable Markov chain. The method is closely related to one proposed by Simon and Ando and developed by Courtois. However, the method described here does not require the determination of a completely decomposable stochastic approximation to the transition matrix and hence it is applicable to matrices other than stochastic. An error analysis of the procedure is given which results in effectively computable error bounds. (Author)

AD-A086 203/7 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Nonparametric Bayesian Estimation of the Horizontal Distance between two Populations.
Interim rept.,
Myles Hollander, and Ramesh Korwar. Mar 80, 11p FSU-STATISTICS-M537, TR-78-104, AFOSR-TR-80-0461
Grant AFOSR-78-3678
Prepared in cooperation with Massachusetts Univ.

The horizontal distance delta (X) =1/G (F(x)) -x has been shown by Doksum (1974) to be a useful measure of difference, at each x, between the populations defined by continuous distribution functions F(x) and G(x).

AD-A086 207/8 PC **A03**/MF **A01**
New York Univ NY Magneto-Fluid Dynamics Div
Similarity Solutions of Systems of Partial Differential Equations Using MACSYMA.
Interim rept.,
P. Rosenau, and J. L. Schwarzmeier. Oct 79, 26p MF-94, COO-3077-160, AFOSR-TR-80-0485
Grant AFOSR-76-2881

A Code has been written to use the algebraic computer system MACSYMA to generate systematically the infinitesimal similarity groups corresponding to systems of quasi-linear partial differential equations. The infinitesimal similarity groups can be used to find exact solutions of the partial differential equations. In an example from fluid mechanics the similarity method using the computer code reproduces immediately a solution obtained from dimensional analysis. (Author)

AD-A086 224/3 MF **A01**
Washington Univ Seattle Dept of Mathematics
Interval Graphs, Chronological Orderings, and Related Matters.
Doctoral thesis,
Dale J. Skrien. May 80, 137p Rept no. TR-71
Contract N00014-67-A-0103-0003
Availability: Microfiche copies only.

This paper is concerned with special interval representations of interval graphs. The basic notion is that of a chronological ordering of an interval graph, which is an equivalence class of interval representations of the graph in question. Consider a reference set P = (l sub 1 ..., (l sub n, r sub 1, ..., r) whose points are to be associated with the respective left and right endpoints of interval representations of a graph having n nodes. Among the questions that are considered in this paper, and are answered both mathematically and algorithmically, are the following: Given an interval graph G with n nodes, which linear orderings on P sub n arise from interval representations of G. Given a partial ordering of P sub n, when can it be expanded to a linear ordering associated with an interval representation of G. How many chronological ordering does a given interval graph have. The theorems and algorithms are applicable to a variety of seriation problems. (Author)

AD-A086 229/2 Not available NTIS
Center for Naval Analyses Alexandria VA Operations Evaluation Group
Small Fluctuations in Systems with Multiple Limit Cycles.
Professional paper,
Marc Mangel. 28 Aug 78, 22p Rept no. OEG-PP-277
Availability: Pub. in SIAM Jnl. on Applied Mathematics, v38 n1 p120-138 Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

BNL-27513 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Generation of Approximating Distributions Through the Method of Stages.
A. S. Noetzel. 1980, 4p CONF-800364-1
Contract EY-76-C-02-0016
Conference on information sciences and systems, Princeton, NJ, USA, 26 Mar 1980.

The method of stages is a technique for representing an arbitrary continuous probability distribution as a series of states (or stages), each of which has an exponentially distributed hold time. Through the use of the method of stages, a discrete-event stochastic simulation may be reduced to a Markov chain. Two techniques for generating the probability distribution function required by the method of stages are discussed. The first, Prony's method, requires evenly spaced samples of the probability functions to be matched. The second method is an iterative algorithm that uses every set of sample values of the required distribution, and, if the mean of the distribution is given, matches the mean exactly. 1 figures. (ERA citation 05:025104)

DOE/EV/02874-64 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Sample Size for Logistic Regression with Small Response Probability. Technical Report No. 33.
A. S. Whittemore. Mar 80, 25p
Contract AC02-76EV02874

The Fisher information matrix for the estimated parameters in a multiple logistic regression can be approximated by the augmented Hessian matrix of the moment generating function for the covariates. The approximation is valid when the probability of response is small. With its use one can obtain a simple closed-form estimate of the asymptotic covariance matrix of the maximum-likelihood parameter estimates, and thus approximate sample sizes needed to test hypotheses about the parameters. The method is developed for selected distributions of a single covariate, and for a class of exponential-type distributions of several covariates. It is illustrated with an example concerning risk factors for coronary heart disease. 2 figures, 2 tables. (ERA citation 05:025108)

DOE/TIC-11182 MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Conjugate Gradients and the Lanczos Algorithm: Solving Large Symmetric Systems of Linear Equation.
D. S. Scott. 1978, 18p
Contract W-7405-ENG-26
Microfiche copies only.

The solution of Ax = b is discussed, where A is a known n x n matrix, b is a known vector of length n, and x is an unknown vector of length n. Advantages and disadvantages of using the Lanczos algorithm are given. The report is in the form of lecture notes. (ERA citation 05:023386)

IFVE-OTF-79-12 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Complete Integrability of a System of Nonlinear Partial Differential Equations in Two-Dimensional Space.
A. N. Leznov. 1979, 12p
In Russian.
U.S. Sales Only.

Full solutions depending on two arbitrary functions are obtained in explicit form for a system of nonlinear partial differential equations. On the basis of the obtained results it is estimated that the duality equation system is fully integrable on the assumption of the cylindrical symmetry. (Atomindex citation 11:500604)

IKE-4-83 MF **A01**
Stuttgart Univ. (TH) (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Statistical Analysis of the BOIL Program in RSYST-III.
W. Beck, and H. J. Hausch. Nov 78, 70p
In German.
U.S. Sales Only. Microfiche copies only.

The paper describes a statistical analysis in the RSYST-III program system. Using the example of the BOIL program, it is shown how the effects of inaccurate input data on the output data can be discovered. The existing possibilities of data generation, data handling, and data evaluation are outlined. (Atomindex citation 10:442198)

JINR-E-5-12420 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Rigged Hilbert Spaces and Topologies on Operator Algebras.
M. Freidrich, and G. Lassner. 1979, 18p
U.S. Sales Only.

To any O pi -algebra of unbounded operators there corresponds a rigged Hilbert space so that all operators are continuous with respect to the topologies. This leads to different topologies of uniformly

bounded convergence on the operator algebra, which are investigated in this paper. Particularly consistent results are obtained if the rigged Hilbert space is a reflexive one. (Atomindex citation 11:500582)

KAPL-4134 PC **A02**/MF **A01**
Knolls Atomic Power Lab., Schenectady, NY.
High-Order Curved Finite Elements.
E. L. Wachspress. Mar 80, 23p CONF-800537-1
Contract AC12-76SN00052
Symposium on finite elements, Storrs, CT, USA, 2 May 1980.

Recent finite element analysis of adaptive refinement has focused attention on high-order approximation within elements. High-order approximation may be attained over curved elements with either rational basis functions expressed directly in the global coordinates or with a particular class of isoparametric basis functions. Theory for construction of high-order rational bases yields modifications to the blending method for a special class of elements in order to achieve higher order approximation within these elements. 9 figures. (ERA citation 05:025110)

N80-27109/1 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Computer Program for Estimation from Incomplete Multinomial Data.
K. R. Credeur. May 78, 77p NASA-TM-78704

Coding is given for maximum likelihood and Bayesian estimation of the vector p of multinomial cell probabilities from incomplete data. Also included is coding to calculate and approximate elements of the posterior mean and covariance matrices. The program is written in FORTRAN 4 language for the Control Data CYBER 170 series digital computer system with network operating system (NOS) 1.1. The program requires approximately 44000 octal locations of core storage. A typical case requires from 72 seconds to 92 seconds on CYBER 175 depending on the value of the prior parameter.

N80-27137/2 PC **A07**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Methods for Solution of Fredholm Integral Equations of the First Kind.
M.S. Thesis - South Africa Univ.
M. L. Baart. Sep 79, 144p CSIR-TWISK-104

A Fredholm integral equation of the first kind is an example of an ill-posed problem, the most troublesome aspect being the fact that the solution need not depend continuously on the given function, so that small inaccuracies in the data can cause large solution deviations. Various methods are investigated for solving these integral equations. These methods are divided into three interconnected classes: (1) best approximate solution methods, (2) singular value decomposition methods, and (3) regularization methods. Selected methods from each category are discussed, as well as connections between these methods. Finally, four methods are used to compute solutions to problems with varying degrees of stability. In all cases considered, the exact solutions are known, so that the accuracy of the computed solutions obtained by different methods can be compared. The results provide some justification for a priori selection of the most suitable method in a given case.

N80-27138/0 PC **A02**/MF **A01**
Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
On a Fisher-Cornish Type Expansion of Wishart Matrices.
D. G. Nel, and P. C. N. Groenwald. Aug 79, 15p TR-47

The limiting distributions of U = the square root of (n)(A/n)-sigma where A is similar to W (sigma,n) or A is similar to W(sigma,n,omega = o(1) is respectively extended to asymptotic approximations to the distributions of U. The Fisher-Cornish approximation to a chi(2)sub n distribution is shown to be a special case of this approximation up to the order terms involved. Asymptotic approximations to the distribution of U = the square root of(n)((A/n)-sigma(i + theta)) is also derived when A is similar to W(sigma,n,omega) and omega = o(n).

N80-27139/8 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimal Control of Partially Observable Jump Diffusion Processes.
M. Friedman. Jul 79, 24p CSIR-TWISK-84

The optimal control problem dealt with is to find a feedback control law. By applying the calculus of variations, necessary conditions on optimal controls are derived, these conditions being given by a pair of coupled nonlinear partial integro-differential equations. A stochastic second-order system, describing a perturbed Duffing oscillator, is used as a test case, and two numerical methods for computing the optimal controls of the system are suggested, the efficiency and applicability of the second method is demonstrated with the aid of examples.

N80-27140/6 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Robust Estimation of the Variogram 1.
N. Cressie. Jul 79, 20p CSIR-TWISK-83

It is a matter of common experience that ore values do not follow the normal (or lognormal) distributions assumed for them, but some other heavier-tailed distribution. The robust estimation is discussed of the variogram when the distribution is normal-like in the central region, but heavier than normal in the tails. It is shown that the use of a fourth-root transformation with or without the use of M-estimation yields stable robust estimates of the variogram.

N80-27141/4 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Initial Estimates of the Moving Average Parameters in a Time Series Model.
D. P. Laurie. Oct 79, 12p CSIR-TWISK-118

An algorithm for the polynomial factorization involved in the initial estimates of the moving average parameters in a time series model is presented. A two stage algorithm is described which uses a linearly convergent algorithm in the fast version until the current iterate is sufficiently accurate to allow the use of a quadratically convergent algorithm, in the fast version. The FORTRAN subroutines are given.

N80-27143/0 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A Geometric Characterization of H-Sets.
M. Brannigan. Oct 79, 13p CSIR-TWISK-121

The geometric characterization of H-sets in terms of convex polyhedral cones or, in special cases, simplices is examined. In particular the characterization of minimal H-sets is considered and used to find an upper bound for the number of possible minimal H-sets of a finite-dimensional space.

N80-27149/7 PC **A04**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Meteorologisch Onderzoek.
Methods for Estimating Spectra Inleiding in Enkele Methoden voor Het Schatten van Spectra.
W. Kuik. 1980, 60p KNMI-V-335
Text in Dutch.

A literature review was performed of techniques for determining the spectra of finite time series. A historic overview is given, with a discussion of general problems in determining spectra. Specific methods with the advantages and disadvantages of each are presented, including periodogram methods, with or without window, the variable record length technique, maximum entropy method, maximum likelihood method and exact spectral representation based on filtering.

N80-27151/3 PC **A02**/MF **A01**
Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
A Circular Approach to Cyclical Data.
D. J. Dewaal, and P. H. Hewitt. Jul 79, 12p TR-45

An approach to analyzing cyclical data such as the number of mosquitoes over the seasons of a year is presented. The data are presented on the circumference of a unit circle and a predictive density is fitted. As calculated the predictive density can also take account of the effect of possible independent variables. An application using the weekly abundance, over a year, of two mosquito species is given.

N80-27154/7 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A Note on the Duality of Time-Varying Decomposable Systems.
G. Naude. Nov 79, 11p CSIR-TWISK-125

Results on the duality between reachability and observability for time-invariant decomposable systems in a category are extended to the time-varying case. In particular the results can be applied to time-varying infinite-dimensional linear systems in Banach spaces, and to time-varying linear systems over rings.

ORNL/TM-7265 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Note on the Robustness of Dixon's Ratio Test in Small Samples.
M. R. Chernick. May 80, 19p
Contract W-7405-ENG-26

Dixon's ratio test is a simple procedure for testing for outliers in statistical data that has been particularly effective when the data come from an underlying normal distribution. The critical values for the normal case are compared to the uniform, exponential, and Cauchy cases with samples of size three, four, and five. When the sample size is three, Dixon's ratio is fairly robust to various departures from normality (i.e., skewness and kurtosis). For symmetric distributions that are not heavy tailed, it appears to be robust in larger sample sizes than just three. However, for the Cauchy case and for very skewed distributions such as the exponential, the critical values are very different even when the sample size is only four. The fact that Dixon's ratio is robust in samples of size three is a valuable practical result, since many times the underlying distribution is not well understood. In a data validation study of a monthly power plant report Dixon's test was applied by grouping the data in sets of three. That application is discussed in this paper. 1 figure, 2 tables. (ERA citation 05:025111)

PB80-809312 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Delphi Method Used in Forecasting. 1970-April, 1979 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 79,
C. Gilbert Young. May 80, 143p
Sponsored in part by National Technical Information Service, Springfield, VA.

The Delphi Method as used in forecasting, arriving at a consensus, or in polling opinion, for a large range of questions, is described in this ten-year retrospective survey. Modification of the basic approach, analyses of the validity of the results, and suggestions for improvements, are included. (Contains 116 citations)

PB80-809338 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Delphi Method Used in Forecasting. 1972-April, 1979 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Apr 79,
C. Gilbert Young. May 80, 25p
Sponsored in part by National Technical Information Service, Springfield, VA.

The Delphi Method as used in forecasting, arriving at a consensus, or in polling opinion, for a large range of questions, is described in this ten-year retrospective survey. Modifications of the basic approach, analyses of the validity of the results, and suggestions for improvements, are included. (Contains 17 citations)

SAND-80-0438C PC **A02**/MF **A01**
Oregon Univ., Eugene. Dept. of Computer and Information Science.

Which Grids Are Hamiltonian.
S. M. Hedetniemi, S. T. Hedetniemi, and P. J. Slater. 1980, 15p CONF-800367-1
Contract EY-76-C-04-0789
11. SE conference on combinatories, graph theory, and computing, Boca Raton, FL, USA, 3 Mar 1980.

A complete grid G/sub m,n/ is a graph having m x n pertices that are connected to form a rectangular lattice in the plane, i.e., all edges of G/sub m,n/ connect vertices along horizontal or vertical lines. A grid is a subgraph of a complete grid. As an illustration, complete grids describe the basic pattern of streets in most cities. This paper examines the existence of Hamiltonian cycles in complete grids and complete grids with one or two vertices removed. It is determined for most values of m,n greater than or equal to 1, which grids G/sub m,n/ - (u) and G/sub m,n/ - (u,v) are Hamiltonian. 12 figures. (ERA citation 05:025112)

UCID-18620 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Improved Monotone Piecewise Cubic Interpolation Algorithm.
F. N. Fritsch. 1 Apr 80, 34p
Contract W-7405-ENG-48

A modification of Butland's formula for derivative values that define a monotone piecewise cubic interpolant to monotone data is presented. The new algorithm preserves the simplicity of Butland's method while producing visually pleasing curves comparable to the original Fritsch-Carlson algorithm. 19 figures. (ERA citation 05:025113)

12B. Operations Research

AD-A085 929/8 PC **A05**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Parameter Estimation and Identification for Systems with Delays.
Interim rept.,
H. T. Banks, J. A. Burns, and E. M. Cliff. Nov 79, 88p AFOSR-TR-80-0403
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092
Sponsored in part by Grants DAAG29-78-G-0125 and NSF-MCS79-05774. Prepared in cooperation with Virginia Polytechnic Inst. and State UNiv., Blacksburg.

Parameter identification problems for delay systems motivated by examples from aerodynamics and biochemistry are considered. The problem of estimation of the delays is included. Using approximation results from semigroup theory, a class of theoretical approximation schemes is developed and two specific cases ('averaging' and 'spline' methods) are shown to be included in this treatment. Convergence results, error estimates, and a sample of numerical findings are given. (Author)

AD-A085 931/4 PC **A04**/MF **A01**
Brown Univ Providence Ri Lefschetz Center for Dynamical Systems
Optimal Exit Probabilities and Differential Games.
Interim rept.,
Wendell H. Fleming, and Chun-Ping Tsai. Jan 80, 57p AFOSR-TR-80-0428
Grants AFOSR-76-3063, NSF-76-07261
Prepared in cooperation with Oklahoma Univ., Norman. Dept. of Mathematics.

The problem is to control the drift of a Markov diffusion process in such a way that the probability that the process exits from a given region D during a given finite time interval is minimum. An asymptotic formula for the minimum exit probability when the process is nearly deterministic is given. This formula involves the lower value of an associated differential game. It is related to a result of Ventsel and Freidlin for nearly deterministic, uncontrolled diffusions. (Author)

AD-A086 162/5 PC **A03**/MF **A01**
Stanford Univ Ca Systems Optimization Lab
A Projected Lagrangian Algorithm for Nonlinear 'l (sub 1)' Optimization.
Technical rept.,
Walter Murray, and Michael L. Overton. Feb 80, 40p SOL-80-4, ARO-16470.10-M
Contracts DAAG29-79-C-0110, DE-AC03-76SF00326
Sponsored in part by Grants NSF-MCS79-26009 and NSF-MCS78-11985.

The nonlinear l (sub 1) problem is an unconstrained optimization problem whose objective function is not differentiable everywhere, and hence cannot be solved efficiently using standard techniques for unconstrained optimization. The problem can be transformed into a nonlinearly constrained optimization problem, but it involves many extra variables. We show how to construct a method based on projected Lagrangian methods for constrained optimization which requires successively solving quadratic programs in the same number of variables as that of the original problem. Special Lagrange multiplier estimates are used to form an approximation to the Hessian of the Lagrangian function, which appears in the quadratic program. A special line search algorithm is used to obtain a reduction in the l (sub 1) objective function at each iteration. Under mild conditions the method is locally quadratically convergent if analytical Hessians are used. (Author)

N80-27142/2 PC **A02**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Tangential Approximations in Abstract Multipiler Rules.
R. J. Gardner. Oct 79, 13p CSIR-TWISK-124
Presented at 10TH Intern. Symp. On Math. Programming, Montreal, 27-31 Aug. 1979.

An axiomatic examination centering around a very general abstract multiplier rule (The intersection principle) is presented. Notions of tangential approximant which combine the advantages of certain existing notions are developed.

N80-27153/9 PC **A18**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Scientific Models and Methods Modelos E Metodo Cientifico.
M.S. Thesis.
A. M. Neto, and H. H. Yanasse. Jan 78, 402p
INPE-1180-TPT/080
Text in Portuguese; English Summary.

Models, their role in the scientific method, their construction, and their use are discussed. The current state-of-the-art is appraised. The fundamentals of modeling are examined in relation to the scientific method. After careful study of the scientific method, the aspects are considered: (1) classification of the types of models based on explaining the relation between the variables; and (2) development of methodology, isomorphic to the pragmatic method, for constructing models. Some existing models are criticized, and an orientation for the systematic use of models is presented.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A085 815/9 PC **A09**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Solar Heating of Buildings and Domestic Hot Water. Revision.
Final rept. Oct 78-Apr 80,
Edward R. Durlak. May 80, 182p Rept no. CEL-TR-877
Revision of Rept. no. CEL-TR-835.

This report presents design criteria and cost analysis for methods for the sizing and justification of solar heat collectors for potable water heaters and space heaters. Sufficient information is presented to enable engineers to design solar space and water heating systems or conduct basic feasibility studies preparatory to design of large installations. Both retrofit and new installations are considered. This report has been substantially revised from the previous edition (Beck and Field, 1977). However, most of the revision is in Section 2.0, where more material of an exploratory nature has been added. Section 3.0, which contains the calculation method and worksheets, is largely the same, except that the economic analysis has been revised and new tables have been added to provide a self-contained source of meteorological data and collector test data.

AD-A085 890/2 MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Instructions on the Design of Boiler Installations SN 350-66.
19 May 80, 186p Rept no. FTD-ID(RS)T-0427-80
Unedited machine trans. of mono. Ukazaniya po Proyektirovaniyu Kotel'nykh Ustanovok SN 350-66, Moscow, 1967, p1-83.
Availability: Microfiche copies only.

No abstract available.

ANL/CNSV-TM-31 PC **A04**/MF **A01**
Argonne National Lab., IL.
Saint Paul Energy Park: The Potential for District Heating.
C. Lee, R. Kron, and H. Davis. Mar 80, 58p
Contract W-31-109-ENG-38

The results of ANL's study of the energy and economic aspects of using district heating in the St. Paul Energy Park are summarized. The Energy Park is a 6 million ft exp 2 residential, commercial office, and light industrial complex to be built in the midway area of St. Paul, Minnesota. Space heating and cooling design loads for the park were calculated assuming that the ASHRAE's 90-75 energy-conserving construction standards would be used in constructing the park's buildings. Based in part on this assumption, ANL estimated the costs and energy use characteristics of six possible energy system options for supplying Energy Park's space heating, space cooling, and domestic hot water heating needs. The results indicate that in today's economy, a central heating and cooling plant with natural gas boilers and electrically driven centrifugal chillers with thermal storage has good potential for energy and economic savings and clearly merits further consideration. (ERA citation 05:020840)

BNL-27602 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
R And D Activities in Pulse Combustion at BNL.
L. M. Woodworth. Nov 79, 9p CONF-791187-1
Contract EY-76-C-02-0016
Symposium on pulse combustion technology for heating applications, Argonne, IL, USA, 29 Nov 1979.

The program at Brookhaven National Laboratory to upgrade the efficiency of residential and commercial building heating systems through the use of improved gas and oil burners with pulsed combustion and of heat recovery equipment is discussed. (ERA citation 05:024248)

BNL-27662 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Solar Assisted Heat Pump Program Overview and Summary of Work at Brookhaven National Laboratory.
J. W. Andrews. 1980, 6p
Contract EY-76-C-02-0016

Four generic paths for avoiding the high utility power demand for solar-assisted heat pump systems when the sun is not shining and storage is depleted are described. These include the bimodal solar-assisted heat pump (SAHP) system, direct-expansion solar collector/heat pump systems, volume-dominated ground-coupled systems, and area-dominated ground coupled systems. Work at BNL on heat pump development, ground coupling, and low-cost collectors for use with these systems is reviewed. (ERA citation 05:023875)

BNL-27667 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Hybrid Photovoltaic/Thermal Systems with a Solar-Assisted Heat Pump.
E. A. Kush. 1980, 7p
Contract EY-76-C-02-0016

An outline of possibilities for effective use of PV/T collectors with a Solar Assisted Heat Pump is

given. A quantitative analysis of the performance and cost of the various configurations as a function of regional climates, using up-to-date results from solar heat pump and PV/T collector studies, will be required for more definitive assessment; and it is recommended that these be undertaken in the PV/T Program. Particular attention should be paid to development of high performance PV/T collectors, matching of heat pump electrical system to PV array and power conditioning characteristics, and optimization of storage options for cost effectiveness and utility impact. (ERA citation 05:023876)

BTHE-020344 PC$113.00
British Standards Institution, Hemel Hempstead (England). Technical Help to Exporters.
Boilers and Pressure Vessels (Second Edition): An International Survey of Design and Approval Requirements.
c1975, 100p
Price to members PC$100.00.

This international survey covers the major regulations, design codes and approval requirements for boilers, stationary pressure vessels, and transportable pressure vessels, including road and rail tankers, and compressed gas cylinders. Specific details of the standards for individual items are not included. (Copyright (c) British Standards Institution, 1975.)

CONF-790541-62 MF **A01**
Wisconsin Univ.-Madison. Solar Energy Lab.
Design Method for Parallel Solar-Heat Pump Systems.
J. V. Anderson, J. W. Mitchell, and W. A. Beckman. 1979, 2p
Contract EY-76-S-02-2588
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979, Portions of document are illegible.
Microfiche copies only.

A procedure has been developed to predict the thermal performance of a parallel solar-heat pump system for residential space and water heating. The performance of the solar system is calculated first using a method such as f-chart. The remaining portion of the load that is met by the heat pump is found from calculations based on the bin method for a heat pump only system. The procedure accounts for the interaction of the two systems to yield the performance of the combined system. The predicted results are compared to those from detailed simulations, and found to agree within 2 percent. (ERA citation 05:015325)

CONF-7910156-1 MF **A01**
Tennessee Valley Authority, Chattanooga.
Browns Ferry Waste Heat Greenhouse Environmental Control System Design.
R. S. Pile, E. R. Burns, E. L. Waddell, Jr., N. G. Hicks, and M. Olszewski. 1979, 20p
Contract W-7405-ENG-26
US/USSR technical exchange and symposium in the areas of heat rejection systems, cogeneration and beneficial uses of waste heat, Washington, DC, USA, 15 Oct 1979.
Microfiche copies only.

The design of the greenhouse near the Browns Ferry Nuclear Power Plant and of its system for controlling environmental, i.e., temperature and humidity, conditions within the greenhouse are discussed. This half-acre greenhouse will use waste heat from the power plant for space heating and cooling. (ERA citation 05:022602)

CONF-791102-167 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Eddy Current Heating of Irregularly Shaped Plates by Slow Ramped Fields.
L. Dresner. 1979, 5p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Theorems are presented for estimating eddy current heating of irregularly shaped plates by a perpendicular ramped field. The theorems, which are derived from two complementary variational principles, give upper and lower bounds to the eddy current heating. Illustrative results are given for rectangles, isosceles triangles, sectors of circular annuli, rhombuses, and L-shaped plates. A comparison is made with earlier work. (ERA citation 05:025048)

DOE/CS/34135-T1 PC **A02**/MF **A01**
Ueland and Junker, Philadelphia, PA.
Solar Atrium: A Hybrid Solar Heating and Cooling System. Technical Progress Report No. 7, March 19, 1979-June 19, 1979.
M. Ueland. 28 Jun 79, 10p
Contract EG-77-G-04-4135

Construction progress is listed and photographs of the solar atrium are included. (ERA citation 05:022185)

DOE/TIC-11192 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Ceramic Heat Pipe Development. Quarterly Report, January 1-March 31, 1980.
M. Merrigan. May 80, 14p
Contract W-7405-ENG-36

Progress in the development of ceramic heat pipes for use in high-temperature heat exchangers for recovering heat from industrial furnaces, particularly furnaces in the steel, aluminum and glass industry, is discussed. (ERA citation 05:024511)

EPRI-FP-1251 PC **A04**/MF **A01**
Radian Corp., Austin, TX.
Summary of Equilibrium and Process Model Data Acquisition: Treatment of Recirculated Cooling Water, Resource Document 1. Interim Report.
W. C. Micheletti, and M. L. Owen. Dec 79, 75p

The results of a comprehensive literature data acquisition effort focusing on all aspects of cooling water chemistry are presented. During this search, special emphasis was given to four subject areas: (1) silica species, (2) phosphate species, (3) softening operations, and (4) chemical cooling water treatments. The data documented are meant to serve three specific purposes: (1) to support development efforts for a computer program capable of describing closed loop recirculating cooling systems, (2) to support the development of an effective field test program for a portable test facility, and (3) to support the development of a laboratory test plan for determining chemical and operational data not found in the literature. (ERA citation 05:024007)

FE-2471-T3 PC **A03**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ. Engineering Technology Dept.
Industrial Application Fluidized Bed Combustion. Category III: Indirect Fired Heaters. Quarterly Technical Report No. 13, July 1-September 30, 1979.
1979, 26p
Contract EX-76-C-01-2471

A program is underway to evaluate the technical and economic potential for the application of fluidized bed combustion to refinery and petrochemical plant indirect fired process heaters. Phase I of the program consists of the design, construction and operation of three laboratory facilities to carry out these studies. Fluidized bed performance studies, including bed mixing and density measurement, have been completed on six alternative tube bundle configurations ranging from 2-inch to 6-inch diameter tubes arranged on nominal 2-diameter, 3-diameter and 4-diameter horizontal spacing. Conductive-convective heat transfer coefficients as a function of tube size, location and surface orientation have also been obtained on these same bundle configurations and on isolated single tubes. Finally, evaluations have been made on the effect of altering the tube-to-grid dimensions and of operating with limestone beds of different particle size distributions. A Process Stream Coking Test Unit has been used to study the parameters affecting coke laydown on the internal surfaces of hydrocarbon containing tubes under conditions of high temperature and heat transfer rate. Construction of the High Temperature Heat Flux Test Unit has been completed and testing has begun. To date, four runs have been completed. The operation of the Heat Flux Unit and the range of data collected is described. (ERA citation 05:022822)

FE-2471-45 PC **A04**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ. Engineering Technology Dept.
Industrial Application Fluidized Bed Combustion: Category III Indirect Fired Heaters. Quarterly Technical Report No. 14, October 1-December 31, 1979.
1979, 52p
Contract EX-76C-01-2471

Fluidized bed performance studies, including bed mixing and density measurement, have been completed on six alternative tube bundle configurations ranging from 2-inch to 6-inch diameter tubes arranged on nominal 2-diameter, 3-diameter and 4-diameter horizontal spacing. Conductive-convective heat transfer coefficients as a function of tube size, location and surface orientation have also been obtained on these same bundle configurations and on isolated single tubes. Finally, evaluations have been made on the effect of altering the tube-to-grid dimensions and of operating with limestone beds of different particle size distributions. The High Temperature Heat Flux Test Unit was put into operation. The first series of tests using propane as the fuel fired has begun. To date, five runs have been completed. The operation of the Heat Flux Unit, the range of data collected, and an analysis of the data are described. The conclusions drawn from the Applications Evaluation study suggest that the potential for near term application of fluidized bed technology to refinery crude oil process heaters is relatively low. In many cases the siting and logistics problems associated with on-site replacement of gas or liquid fired heaters with coal fueled units preclude their practical consideration. A potential alternative application for FBC process heater technology has been identified. This involves the combustion of heavy vacuum bottoms from a synthetic-fuel-from-coal process now under development. (ERA citation 05:022821)

FEI-844 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Evaluation of Lifetime of Evaporative Tubes of Once-Through Steam Generators at Steam-Generating Surface Temperature Oscillations in the Burnout Region.
V. A. Vorob'ev, V. M. Loshchinin, and O. V. Remizov. 1978, 15p
In Russian.
U.S. Sales Only.

Suggested is a method for evaluation of a stressed state of evaporation tubes of once-through steam generators at temperature oscillations in the burnout region. Calculated is the amplitude of steam-generating surface temperature oscillations in the burnout region depending on the frequency of a liquid-steam boundary transfer and on this basis determined are thermal stresses in a tube wall. Knowing a fatigue curve gives the possibility to evaluate a heat transfer tube lifetime. (Atomindex citation 11:502773)

LA-UR-80-693 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Adaptive Control for Energy Conservation.
D. R. Farris. Mar 80, 3p CONF-800340-2
Contract W-7405-ENG-36
DOE active solar heating and cooling contractors' review meeting, Lake Tahoe, NV, USA, 26 Mar 1980.

The objective of this project is to investigate the use of adaptive control concepts in buildings with solar-assisted heating, ventilating, and air-conditioning (HVAC) systems to maintain occupant comfort conditions while minimizing auxiliary energy use. Accomplishing this objective requires an energy management system capable of making sound tradeoffs. Optimal control theory is used along with a system identification technique to provide an adaptable stratgy. The resulting overall approach is known as adaptive optimal control. (ERA citation 05:023884)

N80-26426/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Improved PFB Operations: 400-Hour Turbine Test Results.
R. J. Rollbuhler, S. M. Benford, and G. R. Zellars. 1980, 23p NASA-TM-81511, E-260

Presented at 6TH Intern. Conf. On Fluidized Bed Combust., Atlanta, 9-11 Apr. 1980; Sponsored by Doe, Elec. Power Res. Inst., Epa and Tva.

A pressurized fluidized bed (PFB) coal-burning reactor was used to provide hot effluent gases for operation of a small gas turbine. Preliminary tests determined the optimum operating conditions that would result in minimum bed particle carryover in the combustion gases. Solids were removed from the gases before they could be transported into the test turbine by use of a modified two stage cyclone separator. Design changes and refined operation procedures resulted in a significant decrease in particle carryover, from 2800 to 93 ppm (1.5 to 0.05 grains/std cu ft), with minimal drop in gas temperature and pressure. The achievement of stable burn conditions and low solids loadings made possible a 400 hr test of small superalloy rotor, 15 cm (6 in.) in diameter, operating in the effluent. Blades removed and examined metallographically after 200 hr exhibited accelerated oxidation over most of the blade surface, with subsurface alumina penetration to 20 micron m. After 400 hours, average erosion loss was about 25 micron m (1 mil). Sulfide particles, indicating hot corrosion, were present in depletion zones, and their presence corresponded in general to the areas of adherent solids deposit. Sulfidation appears to be a materials problem equal in importance to erosion.

N80-26695/0 PC **A04**/MF **A01**
Rohr Industries, Inc., Chula Vista, CA.
Design and Fabrication of Titanium Multi-Wall Thermal Protection System (TPS) Test Panels.
Contractor Report, Jan. - Aug. 1979.
W. Blair, J. E. Meaney, Jr., and H. A. Rosenthal.
Feb 80, 66p NASA-CR-159241, RHR-79-111
Contract NAS1-15646

A titanium multiwall thermal protection system panel was designed. The panel is a nine sheet sandwich structure consisting of an upper and lower face sheet; four dimpled sheets, three septum sheets, and clips for attachment to a vehicle structure. An acceptable fabrication process was developed, and the panel design was verified through mechanical and thermal testing of component specimens. A design was completed which takes into consideration fabrication techniques, thermal properties, mechanical properties, and materials availability.

N80-26766/9 PC **A07**/MF **A01**
Travis-Braun and Associates, Inc., Dallas, TX.
Solar Energy Facility at North Hampton Recreation Center, Dallas, Texas.
Final Report.
May 80, 141p NASA-CR-161444
Contract EX-76-C-01-2543

The solar energy facility located at the North Hampton Park Recreation and Health Center, Dallas, Texas is presented. The solar energy system is installed in a single story (two heights), 16,000 sq ft building enclosing a gymnasium, locker area, and health care clinic surrounded by a recreational area and athletic field. The solar energy system is designed to provide 80 percent of the annual space heating, 48 percent of the annual space cooling, and 90 percent of the domestic hot water requirements. The system's operation modes and performance data acquisition system are described. The system's performance during the months of June, July, August, September, and October of 1979 are presented and show a negative savings of energy. Experience to date indicates however that the system concept has promise of acceptable performance. It is concluded that if proper control and sequencing components was maintained, then the system performance would improve to an acceptable level.

N80-26778/4 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Elcam Tempe Arizona State University, Tempe, Arizona.
Progress Report, Jun. 1979 - Jan. 1980.
May 80, 71p NASA-CR-161466
Contract NAS8-32036
Sponsored in Part by DOE.

The solar system, Elcam-Tempe, was designed by Elcam Incorporated, Santa Barbara, California, to supply commercial domestic hot water heating systems to the Agriculture Department residence at Arizona State University. The building is a single story residence located at the agriculture experiment farm of the Arizona State University. The energy system's four modes of operation are described. Electrical energy savings at the site was a net of 5.54 million Btu after the 0.17 million Btu of operating energy required to operate collector loop circulating pump were subtracted. The energy savings due to solar was less than the system's potential. On an average, twice as much hot water could have been used with signifient solar energy contribution. The system corrosion and deposits caused by using dissimilar metals in the collector loop was the only problem noted with the Elcam-Tempe system.

N80-26876/6 PC **A08**/MF **A01**
Entwicklungs- und Forschungslabor, Lorrach (Germany, F. R.).
Water Heating by Solar Energy with Plastic Collectors.
Final Report.
J. Kleinwaecher. Sep 79, 163p BMFT-FB-T-79-29 Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

A low price, high efficiency, light weight, and easy to transport solar collector was developed using a plastic mono- tube with transparent top and dark bottom. Various synthetic materials were examined with regard to their optical and thermal properties and their durability. Prototype installations for swimming pool heating, domestic hot water and house heating in combination with a heat pump are described.

PAT-APPL-6-145 208 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Heating and Cooling System.
Patent Application,
L. Imig, and M. R. Gardner. Filed 30 Apr 80, 13p N80-25693/6, NASA-CASE-LAR-12393-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus capable of cyclic heating and cooling of a test specimen undergoing fatigue testing is disclosed. Cryogenic fluid is passed through a block clamped to the specimen to cool the block and the specimen. Heating cartridges penetrate the block to heat the block and the specimen to very hot temperatures. Control apparatus is provided to alternately activate the cooling and heating modes to effect cyclic heating and cooling between very hot and very cold temperatures. The block is constructed of minimal mass to facilitate the rapid temperature change thereof.

PATENT-4 196 775 Not available NTIS
Department of the Navy Washington DC
Shock-Mounted, Liquid Cooled Cold Plate Assembly.
Patent,
Leon H. Groh. Filed 19 Sep 77, patented 8 Apr 80, 7p AD-D007 341/1, PAT-APPL-834 739
Supersedes PAT-APPL-834 739-77, AD-D004 774.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A shock-mounted, liquid cooled plate assembly for dissipating heat from electronic package mounted on it. A U-shaped cold plate is cast about a tube to provide a passageway for carrying a turbulent flow of coolant along its length. The cold plate is mounted on a vehicle frame by shock-mounted isolator studs which are encapsulated in an elastomer and contained in a housing secured to the frame. An electronic package is mounted on the cold plate by a flange on the package which makes intimate contact with the surface of the cold plate for maximum heat transfer capability. (Author)

PB80-196520 PC **A05**/MF **A01**
Battelle Columbus Labs., OH.
A Solar-Powered Heat Pump Utilizing Pivoting-Tip Rotating Equipment. Phase I.
Progress rept. (Annual) 1 Jul 74-1 Jan 75,
Robert D. Fischer, Donald H. Frieling, and Sherwood G. Talbert. Apr 75, 88p NSF-RA-N-75-202, NSF-RANN/SE/C-876/PR/75/4
Contract NSF-C-876

Development of the Battelle heat-pump concept for the solar heating and cooling of buildings is described. This concept utilizes pivoting-tip rotary-vane equipment. A computer simulation of the Rankine-cycle powered vapor compressor (RC-VC) heat-pump was prepared and used to: (1) analytically determine the feasibility of the Battelle solar heat-pump concept with a single working fluid, a common condenser, and rotary-vane components; and (2) provide the fluid properties, flow rates, displacements, and shaft speed required for conducting the preliminary design of the rotary-vane compressor and expander and the pivoting-tip gas bearings.

PB80-197882 PC **A03**/MF **A01**
Petroleum Conservation Research Association, New Delhi (India).
Replacement of Inefficient Boilers by Modern Package Boilers for Fuel Economy.
1979, 33p

A survey has revealed that a saving of 10% to 20% in fuel oil consumption, in the majority of India's industrial boiler installations, could be realized through replacement of existing boilers with modern package boilers. An assessment is made of the investment needs and savings potential for modernization of oil fired boilers throughout the country. Constraints inhibiting modernization are identified and remedial measures are suggested.

PB80-199532 PC **A07**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Economic Model for Passive Solar Designs in Commercial Environments.
Building science series,
Jeanne W. Powell. Jun 80, 150p NBS-BSS-125
Sponsored in part by Department of Energy, Washington, DC.

The report presents an economic model for evaluating passive solar designs in commercial environments. It discusses the literature on this topic and draws upon this literature to develop a general methodological framework. The model incorporates a life-cycle costing approach that focuses on the costs of purchase, installation, maintenance, repairs, replacement, and energy. It includes a detailed analysis of tax laws affecting the use of solar energy in commercial buildings. Possible methods of treating difficult-to-measure benefits and costs, such as effects of the passive solar design on resale value of the building and on lighting costs, rental income from the building, and the use of commercial space, are presented. The model is illustrated in two case examples of prototypical solar designs for low-rise commercial buildings in an urban setting.

SAND-78-8176 PC **A07**/MF **A01**
Rocket Research Co., Redmond, WA.
Sulfuric Acid and Water Chemical Heat Pump/Chemical Energy Storage Program. Phase II-A. Final Report.
E. C. Clark. 1979, 132p RRC-79-R-627
Contract EY-76-C-04-0789

Solar charged chemical heat pump/chemical energy storage (solar/CHP/CES) devices offer the ability to utilize solar energy for heat pumping, space cooling, and extended duration thermal energy storage. A study of solar/CHP/CES system economics, system optimization and component testing, and assessment of the ability to commercialize the system is presented. Results are reported in detail. (ERA citation 05:023892)

SERI/TP-333-429 PC **A23**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Industrial Process Heat Conference Proceedings.
1979, 533p CONF-791024-
Contract EG-77-C-01-4042
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

Separate abstracts were prepared for 41 of the 54 papers presented. The remaining thirteen papers

were previously included in the data base. (ERA citation 05:023905)

SERI/TP-63-350 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
User Evaluation Study of Passive Solar Residences.
S. Towle. Mar 80, 7p CONF-791022-16
Contract EG-77-C-01-4042
National passive solar energy conference, Kansas City, KS, USA, 3 Oct 1979.

Speculation exists regarding the readiness of various passive techniques for commercialization and the market potential for residential applications. This paper discusses the preliminary findings of a market assessment study designed to document user experiences with passive solar energy. Owners and builders of passive solar homes were interviewed and asked to comment on personal experiences with their homes. (ERA citation 05:021957)

UCRL-15189 MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Site and Building Energy-Conservation Study: Survey of Building 231, Development and Assembly.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 231, Development and Assembly Building, at LLL was conducted. Section II, Summary, contains the results of the Building 231 Study. Section III, Methodology, sets forth a detailed description of the methodology used for data gathering and analysis. Section IV, Building Description, identifies and describes the architectural features, and the HVAC and electric systems. Section V, Building Energy Model, includes a description of the implementation of the DOE-1 energy simulation. The section describes building zones and identifies assumptions and simulation techniques. Section VI, ECO Analyses, includes descriptions of the various energy-conservation opportunities (ECO's). It includes estimated construction costs and energy savings with tabulations of payback time, savings to investment ratios, etc. Recommendations are presented. Supporting data are included in appendices. The DOE-1 program used in the study is the CCB/CALERDA Version 1.4, Update Level 2. (ERA citation 05:016016)

UCRL-15191 MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Site and Building Energy-Conservation Study: Survey of Building 321, Material Fabrication Shops.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 321, Material Fabrication Shops, at LLL was conducted. The survey was based on a review of the design drawings, an on-site inspection of the 149,500-ft exp 2 building, and discussions with the building manager and various operating personnel. Data were collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were investigated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy consumption run was made, together with simulations of the building's performance assuming installation of each of the eight energy-conservation opportunities (ECO's) identified. Energy savings that would result from implementation of the ECO's are presented in a table. Another table summarizes the ECO indices which include the cost savings, capital investment, savings-to-investment ratio, fuel savings, fuel saved-to-investment ratio, and the payback period. (ERA citation 05:016018)

UCRL-15192 MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Site and Building Energy Conservation Study: Survey of Building 131, Engineering.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 131, Engineering, at LLL was made. The survey of Building 131 was based on a review of the design drawings, an on-site inspection of the 271,376-ft exp 2 building, and discussions with the building manager and various operating personnel. Data was collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were investigated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy-consumption run was made, together with simulations of the building's performance assuming installation of each of six energy-conservation opportunities (ECO's) identified. A summary of the energy savings that would result from implementation of the ECO's is presented. (ERA citation 05:016019)

UCRL-15193 MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Site and Building Energy-Convervation Study: Survey of Building 121, Experimental Physics.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 121, Experimental Physics, at LLL was performed. The survey was based on a detailed review of the as-built drawings, several on-site inspections of the 92,000-ft exp 2 building, and discussions with the building manager and various operating personnel. Data were collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were carefully investigated. Thirteen potential energy-conservation opportunities (ECO's) were identified and evaluated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy-consumption run was made, together with simulations of the building's performance assuming installation of the various ECO's. Energy savings and payback periods were calculated for the various alternative ECO's. (ERA citation 05:016020)

13B. Civil Engineering

AD-A085 851/4 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Use of Fabrics and Other Measures for Retarding Reflective Cracking of Asphaltic Concrete Overlays.
Final rept.,
Ralph D. Jackson. Mar 80, 22p WES/MP/GL-80-2, FAA/RD-80/8
Contract DOT-FA78WAI-837

Prevention or control of reflection cracks in asphaltic concrete overlays has been a problem from the inception of this type of construction. The many different treatments that have been tried in an effort to solve this problem are: (1) reinforcement within and below the overlay, (2) bond breakers, (3) stress-relieving layers, (4) asphalt-mix additives, and (5) placement of fabrics between the existing pavement and the overlay. At the present time, no treatment has been tried that will completely prevent the formation of reflection cracks. Some treatments do delay the formation of cracks, while others do not appear to help at all. Indications are that fabrics do have some beneficial effects, such as a moisture barrier, even though the overlays develop reflection cracks. The fabrics that have been tried for the control of reflection cracks included: (1) Petromat, (2) Bidim, (3) Typar, (4) Cerex, (5) Mirafi, (6) Structofors, (7) Bituthene, (8) Protecto-Wrap, and (9) Fiberglass. Asphalt-rubber interlayers, as formulated by the Arizona Refining Company and the Sahuaro Petroleum Company, show promise in retarding reflection cracks. (Author)

AD-A085 918/1 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Dredged Material Research. Notes News - Reviews, etc. Volume D-80-1.
May 80, 8p

Water quality standards may make it necessary to treat the effluent from some dredged material containment areas. The standards regulate both the amount of turbidity and the contaminant content. Since most contaminants are bound to the solid particles, removal or reduction of suspended solids will eliminate or minimize most water quality problems. Earlier small-scale studies indicated that chemical flocculation of containment area effluent was feasible for increasing the settleability of suspended solids. A full-scale test was performed at a containment area in the Vicksburg District, and a significant reduction in effluent suspended solids was realized. Results of the field demonstration are described in the following article. (Author)

AD-A085 928/0 MF **A01**
Naval Oceanographic Office NSTL Station MS
Beach Erosion Study, Little Creek Naval Amphibious Base Virginia.
Provisional technical rept.,
Madan Mohan Das. Aug 74, 78p Rept no. NOO-TR-248
Availability: Microfiche copies only.

A knowledge of shoreline instability, and the rate and direction of littoral transport of sediment is a prerequisite to the planning and design of a shore protection work. In order to construct a system of groins on the eroding Naval Base beaches at Little Creek, Va., pertinent information was obtained on wave climatology, tidal currents, and the history of shoreline changes derived from aerial photographs of the area taken in 1949, 1958, 1971 and 1974. Assuming a symmetrical tidal flow with a zero net sediment transport in the littoral zone, analysis of wave climatological data yields littoral drift rates of 74,500 cu yds/yr moving from east to west, 38,500 cu yds/yr moving from west to east, and a net rate of 36,000 cy yds/yr moving from east to west along the Naval Base beaches. Computations show that maximum longshore current velocities within the surf zone could reach 2.4 ft/sec and 2.0 ft/sec for waves from east and northwest, respectively. Erosion-deposition patterns behind the groins substantiate the east to west direction of net littoral transport computed from wave energy flux considerations. The erosion and deposition rates behind groins also compare reasonably well with the computed rates of longshore transport. In view of the presence of the much longer jetties at the deep entrance channel to Little Creek harbor, the shorter groins on the Naval Base beaches may have little effect on civilian beaches on the down drift side. (Author)

AD-A085 933/0 MF **A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div
National Dam Safety Program. Porter Reservoir Dam (DE 00013) Delaware River Basin, Matson Run Offstream, New Castle County, Delaware. Phase I Inspection Report.
Final rept.,
John J. Williams. Dec 79, 60p
Contract DACW61-78-C-0052
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on visual inspection, available records, calculations and past operational performance, Porter Reservoir, a high hazard potential structure, is judged to be in good overall condition. The reservoir is capable of storing the selected design storm of one half of the Probable Maximum Precipitation. To ensure adequacy of the structure, remedial actions which should be initiated within six months from the date of approval of this report, are provided.

AD-A085 986/8 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Pohatcong Lake Dam (NJ00504), Atlantic Coast Basin, Gifford Mill Branch of Tuckerton Creek, Ocean County, New Jersey. Phase I Inspection Report.
Final rept.

Mar 80, 65p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Pohatcong Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. The dam's spillways are considered inadequate because a flow equivalent to two percent of one half the Probable Maximum Flood would cause the dam to be overtopped. The decision to consider the spillways inadequate instead of seriously inadequate is based on the determination that dam failure from overtopping would not significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure. Actions are recommended to ensure adequacy of the structure.

AD-A085 987/6 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Laurel Springs Dam (NJ00400), Delaware River Basin, North Branch to Timber Creek, Camden County, New Jersey. Phase I Inspection Report.
Final rept.
Mar 80, 67p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on visual inspection, available records, calculations and past operational performance, Laurel Springs Dam, initially listed as a high hazard potential structure but reduced to a low hazard potential structure as a result of this inspection, is judged to be in good overall condition and the spillway is considered adequate. The low hazard potential classification means that in the event of failure of the dam, no loss of life and only minimal economic loss is expected. However, to ensure the continued functioning of the dam and its impoundment, remedial actions are recommended.

AD-A086 061/9 MF **A01**
Jet Propulsion Lab Pasadena CA
Detonation-Flame Arrester Devices for Gasoline Cargo Vapor Recovery Systems.
Final rept.,
R. A. Bjorklund, and P. R. Ryason. Mar 80, 227p
JPL-PUB-80-18, USCG-D-29-80
Contract MIPR-Z-70099-7-74328-H
Availability: Microfiche copies only.

An experimental program was carried out to (1) develop empirical data on the deflagration-to-detonation run-up distance for flowing mixtures of gasoline and air in 15.2-centimeters- (6.0-inches-) diameter piping simulating a vapor recovery system, and (2) evaluate the quenching capability of eight selected flame control devices subjected to repeated stable detonations. The deflagration-to-detonation run-up distance was found to be 11.2 m (36.7 ft), or a length-to-diameter ratio of 74. The relative roughness of the run-up length of piping was 0,010 to 0.015. The stable detonation downstream of the transition point has a velocity of 1800 m/s (5906 ft/s) with a stable peak pressure of 1900 kn/m2 to the 2nd power (275 psia). There appeared to be no discernable correlation between the initial flow velocity used in testing and the resulting run-up distance. Detonations were obtained only at equivalence ratios greater than 0.8; however, there was no correlation between equivalence ratio and run-up distance for equivalence ratios ranging from 0.9 to 1.4. The successful detonation-flame arresters were: (1) sprial-wound, crimped aluminum ribbon, (2) foamed nickel-chrome metal, (3) vertically packed bed of aluminum Ballast rings, and (4) water-trap or hydraulic back-pressure valve.

AD-A086 120/3 PC **A11**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Uttoral Processes Study, Vicinity of Santa Ana River Mouth from Anaheim Bay to Newport Bay, California.
Final rept. 15 Dec 79-29 Feb 80,
Lyndell Z. Hales. Jun 80, 232p Rept no. WES/TR-HL-80-9

The major prolems of this region include: (a) erosion of the beach immediately east of Anaheim Bay (Surfside-Sunset Beach), and (b) optimum location and temporal distribution of up to one million cu yd of material suitable for beach nourishment from the widening and deepening of the Santa Ana River flood-control project. In addition to these major problems, two associated tasks exist: (a) hydraulic design of a tidal flow system to allow for the flooding and emptying of a marsh habitat development area immediately north of the Pacific Coast Highway (on the east side of the Santa Ana River), and (b) development of design feasibility concepts for maintaining an opening at the mouth of the Santa Ana River to allow passage of tidal flow up the river to the habitat area. Complete closure of the exit of the Santa Ana River now occurs as littoral material is trapped between the jetties, particularly during the summer months when riverflow is minimal. The habitat area is being developed to mitigate the loss of 8 acres of wildlife areas resulting from the planned widening of the Santa Ana River, and to preserve 84 additional acres in response to the mandate of the Endangered Species Act. Utilization of as much of this excavation material as possible for beach nourishment purposes is highly desirable.

AD-A086 141/9 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Franklinville Lake (NJ-00442) Delaware River Basin, Little Ease Run of Maurice River, Gloucester County, New Jersey. Phase I Inspection Report.
Final rept.,
Rudolph Wrubel. Mar 80, 61p
Contract DACW61-79-C-0011
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A086 161/7 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Undersea Pipelines and Cables in Polar Water,
Malcolm Mellor. Sep 78, 42p Rept no. CRREL-78-22

Special environmental factors that influence the design, laying and maintenance of undersea pipelines and cables in polar waters are described. Various approaches to the protection of submarine pipes and cables are considered, and prime emphasis is given to burial techniques for shallow water. A wide range of methods for trenching and burying are discussed, and technical data are given. (Author)

AD-A086 172/4 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Five-Year Performance of CRREL Land Treatment Test Cells, Water Quality Plant Yields and Nutrient Uptake.
Special rept. Jun 73-May 78,
Thomas F. Jenkins, Jr., Antonio J. Palazzo, Patricia W. Schumacher, Donald B. Keller, and John M. Graham. Nov 78, 27p Rept no. CRREL-SR-78-26

The performance of the six land treatment cells is summarized over a five-year period from June 1973 through May 1978. The data presented include quality and volume of wastewater applied and percolate resulting from application of primary and secondary wastewater by spray irrigation. Mass loadings and removals are presented as well as crop production and nutrient uptake. Nutrient balance sheets are shown which demonstrate the percentage of nitrogen and phosphorus that is attributed to crop uptake and leachate over this period. (Author)

AD-A086 179/9 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Eaton Brook Reservoir Dam (Inventory Number NY 352), Susquehanna River Basin, Madison County, New York. Phase I Inspection Report,
George Koch. 19 Feb 80, 116p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied. (Author)

AD-A086 180/7 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Lake Adirondack Dam (Inventory Number NY 621), Upper Hudson River Basin, Hamilton County, New York. Phase I Inspection Report,
George Koch. 21 May 80, 88p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied. (Author)

AD-A086 181/5 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Finch Hollow Watershed Project Site 3C (Inventory Number NY 724), Susquehanna River Basin, Broome County, New York. Phase I Inspection Report,
George Koch. 21 May 80, 78p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of the Finch Hollow Site 3C Dam did not reveal conditions which constitute a hazard to human life or property. The total discharge capacity of the spillways is adequate to impound and safely discharge the floodwaters resulting from the Probable Maximum Flood (PMF). To assure the continued satisfactory performance of this structure, a schedule of periodic maintenance should be established. In addition, an emergency action plan for notification of downstream residents should be developed within 6 months of the date of notification of the owner.

AD-A086 182/3 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Lake De Forest Dam (Inventory Number NY 95), Hackensack River Basin, Rockland County, New York. Phase I Inspection Report,
Clark H. Benn. 21 Jun 78, 84p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

The Lake de Forest Dam is well maintained and operated. Nothing was determined to render the dam unsafe. No remedial measures are necessary. However, to monitor actual behavior, instrumentation in the form of weirs and piezometers should be installed within a reasonable period of time and read and evaluated periodically under the supervision of a licensed professional engineer. (Author)

AD-A086 183/1 MF **A01**
New York State Dept of Environmental Conservation Albany

National Dam Safety Program. Kensico Dam (Inventory Number NY51), Bronx River Basin, Westchester County, New York. Phase I Inspection Report,
Clark H. Benn. 7 Jun 78, 75p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The Kensico Dam is maintained in excellent operational condition by the City of New York Personnel. The dam, spillway and pertinent works exhibit no evidence of distress and is stable for all anticipated conditions. Kensico Reservoir is unique in that the major source of inflow, and regulation of discharge and impoundment, are a function of the aqueduct system rather than the contributing watershed area; which is relatively small. As such it has been determined that the Kensico Dam spillway can safely discharge the probable maximum flood. (Author)

AD-A086 184/9 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Erieville Reservoir Dam (Inventory Number NY 369), Oswego River Basin, Madison County, New York, Phase I Inspection Report,
George Koch. 2 Jun 80, 93p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Inspection of this dam revealed that there are a number of deficiencies on this structure some of which are rather serious. Further analysis is required to evaluate and remedy these deficiencies. The most serious of these deficiencies are the two areas of seepage on the downstream slope of the northern section of the dam. The hydrologic/hydraulic analyses performed indicate that the outflows from the Probable Maximum Flood (PMF) will result in the dam being overtopped. The outflows from one-half of the PMF will not result in the dam being overtopped. Therefore, the spillway capacity is rated as inadequate. However, since the outflows from one half the PMF will result in flow around the southwestern end of the embankment, further investigation is required to determine the effects of this condition. The valves for the service spillway pipes are located at the downstream end of the two pipes. This is an undesirable situation since the pipes are constantly subjected to a pressure head. The existing valves should be removed and replaced by valves at the upstream end of the pipes.

AD-A086 225/0 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. St. James Lake Dam (Inventory Number NY 779), St. Lawrence River Basin, Jefferson County, New York. Phase I Inspection Report.
John B Stetson. 14 Feb 80, 110p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY.
Availability: Microfiche copies only.

This report provides information and analysis of the physical condition of the dam as of the report date. St. James Lake Dam, a small, low hazard dam, is an earthen dam constructed in approximately 1923. It is located just north of the Ft. Drum cantonment area. No plans exist for the dam, however, field surveys were taken as part of this inspection. A significant feature of the dam is that it has no emergency spillway outflow occurs. Only through a service spillway consisting on twin 42 inch pipes. The drainage area is 5.14 square miles. The spillway capacity of 400 cfs is only 3 percent of the Probable Maximum Flood (PMF) which was computed to be 13,670 cfs. The 1/2 PMF is 7,046 cfs. Therefore, the dam can pass the 1/2 PMF without being overtopped. The spillway is not considered seriously inadequate based on the Corps of Engineers' screening criteria since the hydrologic/hydraulic analysis indicates that failure of the dam would not pose a high hazard to loss to life from large flows downstream from the dam. However, consideration should be given to provide an emergency spillway adequate to pass 1/2 of the PMF without damage to the structure. This may be undisturbed bank of the impoundment. The deteriorated apron of the existing service spillway should be repaired immediately.

AD-A086 226/8 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Lake Frederick Dam (Inventory Number NY 769), Orange County, New York. Phase I Inspection Report,
Eugene O'Brien. 11 Mar 80, 67p
Contract DACW51-79-C-0001
Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Examination of the available documents and visual inspection of the Lake Frederick Dam and appurtenant structures did not reveal any conditions which are considered to be unsafe. No remedial measures are required to assure the safety of the dam at the present time; however, certain measures are recommended.

AD-A086 227/6 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Lusk Reservoir Dam (Inventory Number NY 771), Orange County, New York. Phase I Inspection Report,
Eugene O'Brien. Mar 80, 76p
Contract DACW51-79-C-0001
Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Examination of available documents and visual inspection of the Lusk Reservoir Dam and appurtenant structures did not reveal conditions which are considered to be unsafe. No remedial measures are required to assure the safety of the dam at the present time. Certain measures are recommended.

AEEW-M-1662 PC **A03**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Critical Release Rates for the Dissociating Gas N sub 2 0 sub 4 /N0 sub 2 /N0.
W. H. L. Porter. Mar 79, 28p
U.S. Sales Only.

Dissociating vapour systems have certain characteristics which make them attractive as coolants, notably a large effective specific heat which is significantly greater than that for the individual components of the gas mixture, and also an enhanced boundary layer heat transfer coefficient resulting from the physical characteristics of thermal dissociation. In part these effects ensure that a dissociating gas has a greatly improved thermal capacity and heat transfer capability when compared with most inert gases. In this report the critical release rates for the dissociating vapour system N sub 2 0 sub 4 -N0 sub 2 -N0 are established, principally in the two phase region, and the thermodynamics of nitrogen tetroxide are examined. (Atomindex citation 11:500085)

ANL/EES-TM-83 PC **A03**/MF **A01**
Argonne National Lab., IL.
Emissions and Effluent Control Costs of the US Pulp and Paper Industry.
P. Grogan. Dec 79, 34p
Contract W-31-109-ENG-38

This report is a compilation of data for an assessment of environmental impacts of the US pulp and paper industry. That assessment will be part of a prototype study of the impacts of environmental legislation on industrial location patterns. The data reported here were gathered from published information and are estimates, by unit process, of emission coefficients for water and air emissions and solid waste. Processes considered are pulping, bleaching, papermaking, and energy conversion operations. Relevant environmental standards are presented, and control technologies required to meet new source performance standards are discussed. Cost estimates of the required control technology are reported on the basis of plant capacity. (ERA citation 05:024588)

CEGB-RD/B/N-4624 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Comparison of the Gaussian Plume Diffusion Model with Experimental Data from Tilbury and Northfleet.
C. D. Barker. Jul 79, 37p
U.S. Sales Only.

The Gaussian Plume Diffusion Model, using Smith's scheme for exp + sub(z) and various models for exp + sub(y), is compared with measured values of the location and strength of maximum ground level concentration taken during the Tilbury and Northfleet experiments. The position of maximum ground level concentration (xsub(m)) is found to be relatively insensitive to exp + sub(y) and Smith's model for exp + sub(z) is found to predict xsub(m) on average to within 50% for plume heights less than 200 - 400m (dependent on atmosphere stability). Several models for exp + sub(y) are examined by comparing predicted and observed values for the normalised maximum ground level concentration (Xsub(m)) and a modified form of Moore's model for exp + sub(y) is found to give the best overall fit, on average to within 30%. Gifford's release duration dependent model for exp + sub(y) is found to consistently underestimate Xsub(m) by 35 - 45%. This comparison is only a partial validation of the models described above and suggestions are made as to where further work is required. (Atomindex citation 11:502258)

CONF-791009-40 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Determining Environmental Impacts of Future Lignite Mining in the South.
R. J. Haynes, R. M. Cushman, J. F. McBrayer, and R. D. Roop. 1979, 10p
Contract W-7405-ENG-26
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

Large deposits of recoverable lignite reserves occur in parts of Texas, Arkansas, Louisiana, Mississippi, and Alabama. In recent years, companies have accelerated exploration for lignite and have demonstrated interest in its use for electrical generation, petrochemical feedstock, and boiler fuel. Surface mining of lignite in the South is projected to increase, especially in the early 1980's. This paper summarizes the location of recoverable lignite reserves and existing and proposed mining operations in the South, and discusses an assessment approach for evaluating potential environmental impacts and constraints to mining resulting from enactment of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-97). Major environmental issues are identified. These are: (1) land disturbance, (2) changes in land use, (3) deterioration of air quality, (4) impacts to surface and ground water, (5) endangered and threatened species, (6) nonreclaimability of some natural ecosystems, (7) use and development of environmental data bases, (8) designation of lands as unsuitable for all or certain types of coal mining, and (9) compliance with the National Environmental Policy Act of 1969. (ERA citation 05:021696)

CONF-800416-5 MF **A01**
Oak Ridge National Lab., TN.
Treatment of Coal Yard Runoff at ORNL.
R. R. Kimmitt, and E. C. Davis. 1980, 15p
Contract W-7405-ENG-26
UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22 Apr 1980.
Microfiche copies only.

At the present time the steam plant at the Oak Ridge National Laboratory (ORNL) is undergoing conversion from oil- to coal-fired boilers. To insure that rainwater runoff from the recently constructed coal storage yard meets current discharge standards, a three phase program was initiated. The first phase was a literature review which pointed out

the great variability in chemical composition of runoff samples and demonstrated the site-specific nature of the problem. Next, a laboratory treatability study was conducted using samples of runoff from coal identical to that stored on the ORNL yard. In the last phase of the program, data from the study (i.e., chemical dosages, reaction rates, sludge characteristics) were used in the design of a treatment system. The project is currently in the final phase of detailed design. (ERA citation 05:021667)

CONF-800416-6 MF **A01**
Oak Ridge National Lab., TN.
NO/Sub X/ Scrubbing at ORNL.
T. E. Pearson, and R. M. Counce. 1980, 14p
Contract W-7405-ENG-26
UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22 Apr 1980.
Microfiche copies only.

Concern over the level of emission of nitrogen oxides (NO/sub x/) from nuclear fuel reprocessing facilities has focused the efforts of research, development and engineering on ways of reducing their concentration in off-gas streams. Research began back in January of 1976. A scrubber design which incorporated the research work began in mid September of 1978. The scrubber is presently being fabricated and will become a part of the Integrated Process Demonstration (IPD) facility. This paper will present an introduction to the chemistry of NO/sub x/ and will discuss the problems associated with its removal from off-gas streams. The IPD NO/sub x/ off-gas system components will be presented and the system interfaces with the other IPD systems will be shown. The computer model used to design the scrubber will be discussed and the results from the program will be presented. The paper will conclude with a brief description of other scrubber applications and will mention areas of continuing research. (ERA citation 05:021874)

DOE/EA-0065 PC **A11**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Resource Applications.
Environmental Assessment: Geothermal Energy Geopressure Subprogram. DOE Sweet Lake No. 1, Cameron Parish, Louisiana.
Feb 80, 245p

The following are described: the proposed action; existing environment; probable impacts, direct and indirect; probable cumulative and long-term environmental impacts; accidents; coordination with federal, state, and local agencies; and alternatives. (ERA citation 05:015556)

DOE/EA-0095 PC **A05**/MF **A01**
Occidental Oil Shale, Inc., Grand Junction, CO.
Environmental Assessment: DOE/Occidental Oil Shale, Inc. Cooperative Agreement, Phase II, Oil Shale Retorting, Logan Wash Site, Garfield County, Colorado.
Nov 79, 88p

The Occidental modified in situ process for producing shale oil is discussed. The environmental impacts of Phase II oil shale retorting are reported. A description of existing conditions of air quality, water quality, and ecology of the Logan Wash Site in Garfield County, Colorado is presented. The potential environmental impacts of the construction phase, operation phase, and post-operation phase are discussed. The aesthetic, recreational, cultural, socio-economic, health, and safety aspects of this project are also covered. (ERA citation 05:023659)

DOE/EV-0055 MF **A01**
Department of Energy, Washington, DC. Office of Technology Impacts.
Environmental Control Costs for Oil Shale Processes.
Oct 79, 601p
Microfiche copies only.

The studies reported herein are intended to provide more certainty regarding estimates of the costs of controlling environmental residuals from oil shale technologies being readied for commercial application. The need for this study was evident from earlier work conducted by the Office of Environment for the Department of Energy Oil Shale Commercialization Planning, Environmental Readiness Assessment in mid-1978. At that time there was little reliable information on the costs for controlling residuals and for safe handling of wastes from oil shale processes. The uncertainties in estimating costs of complying with yet-to-be-defined environmental standards and regulations for oil shale facilities are a critical element that will affect the decision on proceeding with shale oil production. Until the regulatory requirements are fully clarified and processes and controls are investigated and tested in units of larger size, it will not be possible to provide definitive answers to the cost question. Thus, the objective of this work was to establish ranges of possible control costs per barrel of shale oil produced, reflecting various regulatory, technical, and financing assumptions. Two separate reports make up the bulk of this document. One report, prepared by the Denver Research Institute, is a relatively rigorous engineering treatment of the subject, based on regulatory assumptions and technical judgements as to best available control technologies and practices. The other report examines the incremental cost effect of more conservative technical and financing alternatives. An overview section is included that synthesizes the products of the separate studies and addresses two variations to the assumptions. (ERA citation 05:021817)

DOE/EV-0068 PC **A07**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
State-of-the-ART Hydrogen Sulfide Control for Geothermal Energy Systems: 1979.
F. B. Stephens, J. H. Hill, and P. L. Phelps, Jr.
Mar 80, 145p
Contract W-7405-ENG-48

Existing state-of-the-art technologies for removal of hydrogen sulfide are discussed along with a comparative assessment of their efficiencies, reliabilities and costs. Other related topics include the characteristics of vapor-dominated and liquid-dominated resources, energy conversion systems, and the sources of hydrogen sulfide emissions. It is indicated that upstream control technologies are preferred over downsteam technologies primarily because upstream removal of hydrogen sulfide inherently controls all downstream emissions including steam-stacking. Two upstream processes for vapor-dominated resources appear promising; the copper sulfate (EIC) process, and the steam converter (Coury) process combined with an off-gas abatement system such as a Stretford unit. For liquid-dominated systems that produce steam, the process where the non-condensible gases are scrubbed with spent geothermal fluid appears to be promising. An efficient downstream technology is the Stretford process for non-condensible gas removal. In this case, partitioning in the surface condenser will determine the overall abatement efficiency. Recommendations for future environmental control technology programs are included. (ERA citation 05:023993)

DOE/EV-0073 PC **A06**/MF **A01**
Mitre Corp., McLean, VA.
Environmental Data Energy Technology Characterizations: Synthetic Fuels.
Apr 80, 103p
Contract EX-76-C-10-3876

Environmental Data Energy Technology Characterizations are publications which are intended to provide policy analysts and technical analysts with basic environmental data associated with key energy technologies. This publication provides documentation on synthetic fuels (coal-derived and oil shale). The transformation of the energy in coal and oil shale into a more useful form is described in this publication in terms of major activity areas in the synthetic fuel cycles, that is, in terms of activities which produce either an energy product or a fuel leading to the production of an energy product in a different form. The activities discussed in this document are coal liquefaction, coal gasification, in-situ gasification, and oil shales. These activities represent both well-documented and advanced activity areas. The former activities are characterized in terms of actual operating data with allowance for future modification where appropriate. Emissions are assumed to conform to environmental standards. The advanced activity areas examined are those like coal liquefaction and in-situ retorting of oil shale. For these areas, data from pilot or demonstration plants were used where available; otherwise, engineering studies provided the data. The organization of the chapters in this volume is designed to support the tabular presentation in the summary volume. Each chapter begins with a brief description of the activity under consideration. The standard characteristics, size, availability, mode of functioning and place in the fuel cycle are presented. Next, major legislative and/or technological factors influencing the commercial operation of the activity are offered. Discussions of resources consumed, residuals produced, and economics follow. To aid in comparing and linking the different activity areas, data for each area are normalized to 10 exp 12 Btu of energy output from the activity. (ERA citation 05:021605)

DOE/EV-0075 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Environment.
Environmental Data, Energy Technology Characterizations: Petroleum.
N. M. Serrajian. Apr 80, 81p

Environmental Data Energy Technology Characterizations are publications which are intended to provide policy analysts and technical analysts with basic environmental data associated with key energy technologies. The first publication, Summary, provides information in tabular form on the eight technology areas examined; subsequent publications provide more detailed information on the technologies. This publication provides documentation of petroleum. The transformation of the energy in petroleum into a more useful form is described in this document in terms of major activity areas in the petroleum cycle, that is, in terms of activities which produce either an energy product or a fuel leading to the production of an energy product in a different form. These activities represent both well-documented and less well-documented activity areas. The former activities are characterized in terms of actual operating data with allowance for future modification where appropriate. Emissions are assumed to conform to environmental standards. The less well-documented activity areas examined are those like oil storage in salt domes and exploration for which engineering studies were performed. The organization of the chapters in this volume is designed to support the tabular presentation in the Summary. Each chapter begins with a brief description of the activity under consideration. The standard characteristics, size, availability, mode of functioning, and place in the fuel cycle are presented. Next, major legislative and/or technological factors influencing the commercial operation of the activity are offered. Discussions of resources consumed, residuals produced, and economics follow. To aid in comparing and linking the different activity areas, data for each area are normalized to 10 exp 12 Btu of energy output from the activity. (ERA citation 05:021777)

DOE/EV-0077 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Technology Impacts.
Environmental Data, Energy Technology Characterizations: Geothermal.
Apr 80, 40p

Two hydrothermal convective systems are discussed: vapor-dominated and liquid dominated. The following topics are covered for each: characteristics, constraints, resource consumption, environmental considerations, and economic data. (ERA citation 05:022262)

DOE/EV-0078 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Div. of Ecological Research.
Environmental Research on a Modified In Situ Oil Shale Task Process. Progress Report.
May 80, 108p

This report summarizes the progress of the US Department of Energy's Oil Shale Task Force in its research program at the Occidental Oil Shale, Inc. facility at Logan Wash, Colorado. More specifically, the Task Force obtained samples from Retort 3E and Retort 6 and submitted these samples to a variety of analyses. The samples collected included: crude oil (Retort 6); light oil (Retort 6); product

water (Retort 6); boiler blowdown (Retort 6); makeup water (Retort 6); mine sump water; groundwater; water from Retorts 1 through 5; retort gas (Retort 6); mine air; mine dust; and spent shale core (Retort 3E). The locations of the sampling points and methods used for collection and storage are discussed in Chapter 2 (Characterization). These samples were then distributed to the various laboratories and universities participating in the Task Force. For convenience in organizing the data, it is useful to group the work into three categories: Characterization, Leaching, and Health Effects. While many samples still have not been analyzed and much of the data remains to be interpreted, there are some preliminary conclusions the Task Force feels will be helpful in defining future needs and establishing priorities. It is important to note that drilling agents other than water were used in the recovery of the core from Retort 3E. These agents have been analyzed (see Table 12 in Chapter 2) for several constituents of interest. As a result some of the analyses of this core sample and leachates must be considered tentative. (ERA citation 05:023660)

DOE/EV/10286-2 MF **A01**
Hart (Fred C.) Associates, Inc., New York.
Impacts of TSCA on SRC-II Commercialization.
Sep 79, 53p
Contract AC02-79EV10286
Microfiche copies only.

The Toxic Substances Control Act of 1976 (TSCA) is one set of environmental legislation that might constrain the commercialization of coal conversion plants. This paper examines the potential impacts of TSCA on coal conversion using the Solvent-Refined Coal (SRC-II) process of coal liqudfaction as representative of emerging conversion technologies. The key element in any assessment of the impact of TSCA on the SRC-II coal liquefaction process is an assessment of the potential hazard to human health and the environment posed by the SRC-II products and by-products. Our analysis shows that many SRC-II products and by-products may be considered hazardous in that they are reported to contain appreciable amounts of naphthalenes, phenanthrenes, alkyl benezenes, and other aromatic hydrocarbon compounds. Table E-I illustrates some of the possible constraints that the implementation of TSCA might impose on the commercialization of SRC-II or other coal liquefaction processes. Although the table indicates that TSCA may place many constraints on the SRC-II process, these constraints will probably not pose a substantial hindrance to commercialization prospects. Detailed studies must be conducted to determine the actual economic impacts of TSCA implementation before an accurate assessment of the ultimate impact on SRC-II commercialization can be determined. (ERA citation 05:021743)

DOE/EV/10298-1 MF **A01**
Colorado Univ. at Denver.
Trace Elements in Oil Shale. Progress Report, 1979-1980.
W. R. Chappell. 1980, 362p
Contract AC02-79EV10298
Microfiche copies only.

The purpose of this research program is to understand the potential impact of an oil shale industry on environmental levels of trace contaminants in the region. The program involves a comprehensive study of the sources, release mechanisms, transport, fate, and effects of toxic trace chemicals, principally the trace elements, in an oil shale industry. The overall objective of the program is to evaluate the environmental and health consequences of the release of toxic trace elements by shale and oil production and use. The baseline geochemical survey shows that stable trace elements maps can be constructed for numerous elements and that the trends observed are related to geologic and climatic factors. Shale retorted by above-ground processes tends to be very homogeneous (both in space and in time) in trace element content. Leachate studies show that significant amounts of B, F, and Mo are released from retorted shales and while B and Mo are rapidly flushed out, F is not. On the other hand, As, Se, and most other trace elements are not present in significant quantities. Significant amounts of F and B are also found in leachates of raw shales. Very large concentrations of reduced sulfur species are found in leachates of processed shale. Very high levels of B and Mo are taken up in some plants growing on processed shale with and without soil cover. There is a tendency for some trace elements to associate with specific organic fractions, indicating that organic chelation or complexation may play an important role. Many of the so-called standard methods for analyzing trace elements in oil shale-related materials are inadequate. A sampling manual is being written for the environmental scientist and practicing engineer. A new combination of methods is developed for separating the minerals in oil shale into different density fractions. Microbial investigations have tentatively identified the existence of thiobacilli in oil shale materials such as leachates. (ERA citation 05:021818)

DOE/NASA/1040-80/14 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Catalyst Length and Downstream Reaction Distance on Catalytic Combustor Performance.
D. Anderson. 1980, 26p NASA-TM-81475
Contract EC-77-A-31-1040

A study was made to determine the effects on catalytic combustor performance which resulted from independently varying the length of a catalytic reactor and the length available for gas-phase reactions downstream of the catalyst. Monolithic combustion catalysts from three manufacturers were tested in a combustion test rig with No. 2 diesel fuel at an inlet-air temperature of 1000 exp 0 K, a pressure of 3 x 10 exp 5 Pa, reference velocities of 10 and 15 m/s, and adiabatic combustion temperatures of 1200 to 1500 exp 0 K. Catalytic reactor lengths of 2.5 and 5.4 cm, and downstream gas-phase reaction distances of 7.3, 12.4, 17.5, and 22.5 cm were evaluated. Measurements of carbon monoxide, unburned hydrocarbons, nitrogen oxides, and pressure drop were made. The catalytic-reactor pressure drop was less than 1 percent of the upstream total pressure for all test configurations and test conditions. Nitrogen oxides and unburned hydrocarbons emissions were less than 0.25 g NO sub 2 /kg fuel and 0.6 g HC/kg fuel, respectively. The minimum operating temperature (defined as the adiabatic combustion temperature required to obtain carbon monoxide emissions below a reference level of 13.6 g CO/kg fuel) ranged from 1230 exp 0 K to 1500 exp 0 K for the various conditions and configurations tested. The minimum operating temperature decreased with increasing total (catalytic-reactor-plus-downstream-gas-phase-reaction-zone) residence time but was independent of the relative times spent in each region when the catalytic-reactor residence time was greater than or equal to 1.4 ms. (ERA citation 05:024337)

DOE/NASA/9416-80/2 MF **A01**
Engelhard Minerals and Chemicals Corp., Edison, NJ. Engelhard Industries Div.
Durability Testing at 5 Atmospheres of Advanced Catalysts and Catalyst Supports for Gas Turbine Engine Combustors.
B. A. Olson, H. C. Lee, I. T. Osgerby, R. M. Heck, and H. Hess. Apr 80, 93p NASA-CR-159839
Contract EF-77-A-01-2593
Microfiche copies only.

Studies were conducted under a NASA contract funded by DOE to experimentally demonstrate the durability of conclusion ATCOM catalysts and catalyst supports in a combustion environment under simulated gas turbine engine combustor operating conditions. A test of 1000-hours duration was completed with one catalyst using No. 2 diesel fuel and operating at catalytically-supported thermal combustion conditions. This five-atmosphere pressure durability test was conducted using an air-preheat temperature of about 640 exp 0 K and a reference velocity of about 14 meters/second. The adiabatic flame temperature of the fuel/air mixture was 1533 exp 0 K. The performance of the catalyst was determined by monitoring emissions throughout the test, and by examining the physical condition of the catalyst core at the conclusion of the test. Tests were performed periodically to determine changes in cataytic activity of the catalyst core. Detailed parametric studies were also run at the beginning and end of the durability test, using No. 2 fuel oil. Initial and final emissions for the 1000-hours test respectively were: unburned hydrocarbons (C sub 3 vppm): 0, 146; carbon monoxide (vppm): 30, 2420; nitrogen oxides (vppm): 5.7, 5.6. (ERA citation 05:024338)

DOE/PC/20023-1 PC **A02**/MF **A01**
Pittsburgh Univ., PA. Dept. of Civil Engineering.
Fnvironmentally Acceptable Disposal of Coal Conversion Solid Waste Residuals. Progress Report, April 21, 1979-July 31, 1979.
R. D. Neufeld. 1 Aug 79, 10p
Contract AC22-79PC20023

Laboratory and report preparation activities are underway to investigate basic phenomena that would assist demonstration and commercial sized coal conversion facilities in the environmentally acceptable disposal of process solid waste residuals. Laboratory columnar and rapid leaching evaluations are being conducted in accord with RCRA guidelines and other techniques. Preparations are being made for Ames Testing of derived leachates. (ERA citation 05:023458)

DOE/PC/20023-3 PC **A02**/MF **A01**
Pittsburgh Univ., PA.
Laboratory Leaching of Coal Conversion Solid Wastes. Progress Report, November 1, 1979-January 31, 1980.
R. D. Neufeld, S. Wallach, H. Erdogan, J. Bern, and M. A. Shapiro. 1 Mar 80, 19p
Contract AC22-79PC20023

Laboratory evaluations have been conducted on four solid waste samples from coal conversion processes. These samples include two liquefaction wastes and two gasification wastes. All samples were sieved using number 20, 40, 60, 100, and 200 mesh U.S. Standard Sieves. Sieving was conducted by placing the samples on a ro-tap for about 30 minutes each sieving session. Many sieving sessions were found necessary to obtain sufficient quantities of the smaller sized fractions. In all cases, the smaller particle sizes released more material into the leaching media than did the larger particles. (ERA citation 05:021668)

FE-2608-1S PC **A02**/MF **A01**
General Electric Co., Philadelphia, PA. Space Sciences Lab.
Coal Slag Based Glasses for Hot Gas Clean-Up. Semi-Annual Report, 1 January 1979-30 June 1979.
1 Aug 79, 20p
Contract EF-77-C-01-2608

The development and testing of a unique hot gas clean-up process is described. It utilizes waste glass at temperatures of 1800 to 2000 exp 0 F to efficiently capture and dissolve the combustion by-products by several techniques. These include a cyclone, an impactor, and a bubbler section i the apparatus. Preliminary results indicate an apparent collection efficiency of 92 to 98%. The process is continuous and yields a low solubility, dense glassy product showing extremely low leachability. (ERA citation 05:021576)

FE-2608-1T PC **A02**/MF **A01**
General Electric Co., Philadelphia, PA. Space Sciences Lab.
Leachate Studies of Coal Slag Based Glasses.
L. R. McCreight. 1 Aug 79, 14p
Contract EF-77-C-01-2608

Coal slag based glasses are being studied in a process for hot gas cleanup. Other than clean hot gases, the product of the process is expected to be at least a well sintered if not completely fused glass consisting of fly ash and dolomite or limestone in a container glass base. This product will be much more dense and therefore more easily handled than loose fly ash. That feature should permit either easier disposal or possibly the use of these waste products are of interest as an indication of the durability of building products and from an environmental impact standpoint if they are simply used as land fill. Samples of a typical fly ash-dolomite mixture, powdered container glass as well as 30:70 and 70:30 fused mixtures of the two primary ingredients were prepared and subjected to two different leaching tests by outside laboratories. The results are presented in this report and indicate a marked reduction in solubility

of the glassy mixtures compared to the fly ash and container glass which in general exhibit very low solubility. The ingredients as well as the fused mixtures were within the current EPA guidelines for toxic substances. (ERA citation 05:021577)

FE-2608-32 PC **A04**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Feasibility Study of Coal Slag Based Glasses for Hot Gas Clean-Up. Final Report, Phase 2.
A. Gatti, H. W. Goldstein, L. R. McCreight, and H. W. Semon. Feb 80, 57p
Contract EF-77-C-01-2608

The development and testing of a unique hot gas clean-up process is described. It utilizes waste glass at temperatures in excess of 1000 exp 0 C to efficiently capture and dissolve the particulate combustion by-product by several techniques. These include a cyclone, an impactor, and a bubbler section in the apparatus. Results indicate an apparent collection efficiency of greater than 95%. The process is continuous and yields a low solubility, dense glassy product showing extremely low leachability. (ERA citation 05:021578)

FE-2757-3 PC **A13**/MF **A01**
Air Products and Chemicals, Inc., Marcus Hook, PA.
Hot, Low-Btu Producer Gas Desulfurization in Fixed Bed of Iron Oxide-Fly Ash. Final Report, July 1977-March 1978.
D. Joshi, J. H. Olson, M. L. Hayes, and V. Shah. 1 Jun 79, 283p
Contract EF-77-C-01-2757

This work was undertaken to aid DOE in the development of a fixed-bed cyclic process for desulfurizing hot, low-Btu (100 to 140 Btu/SCF) producer gas with iron oxide sorbents. In this process low-Btu producer gas contaminated with hydrogen sulfide passes through a freshly regenerated fixed bed of supported iron oxide at 1200 exp 0 F and 150 psig. Hydrogen sulfide reacts with iron oxide to yield iron sulfide and steam. Absorption from the producer gas continues until the hydrogen sulfide concentration in the exit stream rises to ten percent of the inlet concentration. Most of the iron oxide in the bed is converted to iron sulfide at this breakthrough point. The bed then is regenerated with a mixture of air and diluent gas. The regeneration reactions are highly exothermic, and the diluent gas limits the maximum temperature rise in the bed. During regeneration iron sulfide is converted to iron oxide, and sulfur dioxide is formed. The economics of hot stage desulfurization of low-Btu producer gas in a cyclic fixed bed were evaluated over a wide range of process variables including linear velocity of the producer gas, operating pressure, onstream cycle length, iron oxide content of the sorbent, pellet diameter, sorbent life and sorbent cost. Capital investment for a regenerative fixed-bed desulfurization unit designed to process producer gas for a 500 megawatt generating plant is 22.4 to 26.2 million dollars for typical operating conditions. Nearly 75 percent of the cost is for regeneration facilities, and he compressors account for nearly 50 percent of the major equipment cost. The total processing cost for desulfurizing low-Btu producer gas ranges from 16.5 cents per MM Btu to 28.1 cents per MM Btu for typical operating conditions. Major contributions to the total processing cost are from sorbent cost, finance charges and depreciation. (ERA citation 05:021580)

FE-3269-14A PC **A02**/MF **A01**
Dorr-Oliver, Inc., Stamford, CT.
Design, Construction, Operation and Evaluation of a Prototype Culm Combustion Boiler/Heater Unit.
Aug 79, 17p CW-WR-78-036-14
Contract ET-78-C-01-3269

Technical and economical analyses of various boiler system arrangements were made. These studies showed economic advantages for an integrated fluid bed/steam generation system. Though capital costs for a culm-fueled boiler are higher than coal-fueled boilers, the cost of steam is lower using the culm as fuel. (ERA citation 05:021673)

FE-3269-4A PC **A03**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
Design, Construction, Operation and Evaluation of a Prototype Culm Combustion Boiler/Heater Unit. Technical Progress Report, October 1, 1978-December 31, 1978.
Jan 79, 33p CW-WR-78-036-4
Contract ET-78-C-01-3269

This report provides a summary of the work performed on the Prototype Culm Combustion Boiler/Heater Unit, Phase I - Engineering Design and Analysis during the period October 1, 1978 through December 31, 1978. The objectives of the program as well as technical progress and problem areas encountered are presented. Progress on the components and system engineering studies is described. Preliminary results of the combustion of anthracite culm in a fluidized bed are presented. Environmental investigation in the area of air quality, noise and liquid and solid waste effluent disposal has been initiated and is described herein. (ERA citation 05:021672)

METC/SP-79/10(Pt.1) PC **A21**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Fifth International Ash Utilization Symposium.
J. H. Faber, and A. W. Babcock. 1979, 476p
CONF-790205-(Pt.1)
International ash utilization symposium, Atlanta, GA, USA, 25 Feb 1979.

The Fifth International Ash Utilization Symposium was sponsored by the National Coal Association, American Public Power Association, US Department of Energy, National Ash Association, US Environmental Protection Agency, and the Edison Electric Institute. It was held at Atlanta, Georgia, February 25-27, 1979. Twenty-seven papers from the proceedings have been entered individually into EDB and ERA. The papers deal with the characterization of fly ash, ashes, slags and sludges and their possible uses or methods of waste disposal. (ERA citation 05:023460)

METC/SP-79/10(Pt.2) PC **A21**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Fifth International Ash Utilization Symposium.
J. H. Faber, and A. W. Babcock. 1979, 486p
CONF-790205-(Pt.2)
International ash utilization symposium, Atlanta, GA, USA, 25 Feb 1979.

The Fifth International Ash Utilization Symposium was sponsored by the National Coal Association, American Public Power Association, US Department of Energy, National Ash Association, US Environmental Protection Agency and the Edison Electric Institute. It was held at Atlanta, Georgia, February 25 to 27, 1979. Thirty-eight papers from Part 2 of the proceedings have been entered individually into ERA and EDB. The papers in Part 2 deal mainly with the use of fly ash in cements, concretes and grout; the use or waste disposal in roads, embankments and backfilling underground mines; and, in a few cases for the neutralization of acid mine drainage or the conditioning of soils. Several papers deal with the chemical composition of fly ash, with its physical and chemical properties and their variability. (ERA citation 05:023482)

N80-26668/7 PC **A07**/MF **A01**
Kloeckner-Humboldt-Deutz A.G., Cologne (Germany, F. R.).
Low Emission Vehicle Engine Based on the AD Process.
Final Report.
H. Kuepper. Jun 79, 141p DOE-TR-212

An existing multifuel system, derived from a diesel engine (AD system KHD) was designed for running on gasoline only. The advantages of the diesel engine (low specific fuel consumption and low gaseous emissions) are combined with those of the Otto engine (high specific power, no soot). The system selected for the transfer to the multicylinder engine is characterized by late mixing of fuel and air near the wall of the piston bowl. It is suitable for supercharging and its fuel consumption is typical for diesel engines. Moreover, the system has low black smoke levels and is largely insensitive to the octane and cetane numbers of the fuel. The relatively high HC and CO emissions of the system were reduced by the installation of a precious metal catalyst. The multicylinder engine BF 6 L 510 adapted with the Deutz-stratified charge system was installed in a Magirus-Deutz R 81 bus with which test bed and roller dynamometer trials were carried out.

N80-26744/6 PC **A04**/MF **A01**
General Electric Co., Philadelphia, PA.
Assessment of the Use of Space Technology in the Monitoring of Oil Spills and Ocean Pollution: Executive Summary.
U. R. Alvarado. Apr 80, 68p NASA-CR-159243
Contract NAS1-15657

The adequacy of current technology in terms of stage of maturity, of sensing, support systems, and information extraction was assessed relative to oil spills, waste pollution, and inputs to pollution trajectory models. Needs for advanced techniques are defined and the characteristics of a future satellite system are determined based on the requirements of U.S. agencies involved in pollution monitoring.

N80-26745/3 PC **A20**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Assessment of the Use of Space Technology in the Monitoring of Oil Spills and Ocean Pollution: Technical Volume. Executive Summary.
U. R. Alvarado, G. Chafaris, J. Chestek, J. Contrad, and G. Frippel. Apr 80, 464p NASA-CR-159242, DOC-80SDS4203
Contract NAS1-15657

The potential of space systems and technology for detecting and monitoring ocean oil spills and waste pollution was assessed as well as the impact of this application on communication and data handling systems. Agencies charged with responsibilities in this area were identified and their measurement requirements were ascertained in order to determine the spatial resolution needed to characterize operational and accidental discharges. Microwave and optical sensors and sensing techniques were evaluated as candidate system elements. Capabilities are described for the following: synthetic aperture radar, microwave scatterometer, passive microwave radiometer, microwave altimeter, electro-optical sensors currently used in airborne detection, existing space-based optical sensors, the thematic mapper, and the pointable optical linear array.

N80-26750/3 PC **A10**/MF **A01**
Miami Univ., Coral Gables, FL. School of Engineering and Architecture.
Three Dimensional Thermal Pollution Models. Volume 1: Review of Mathematical Formulations.
Final Report.
S. S. Lee, and S. Sengupta. May 78, 202p
NASA-CR-154624-V-1, KSC-TR-43-2-V-1
Contract NAS10-8926
3.

A mathematical model package for thermal pollution analyses and prediction is presented. These models, intended as user's manuals, are three dimensional and time dependent using the primitive equation approach. Although they have sufficient generality for application at sites with diverse topographical features; they also present specific instructions regarding data preparation for program execution and sample problems. The mathematical formulation of these models is presented including assumptions, approximations, governing equations, boundary and initial conditions, numerical method of solution, and same results.

N80-26751/1 PC **A16**/MF **A01**
Miami Univ., Coral Gables, FL. School of Engineering and Architecture.
Three Dimensional Thermal Pollution Models. Volume 2: Rigid-Lid Models.
Final Report.
S. S. Lee, and S. Sengupta. May 78, 364p
NASA-CR-154624-V-2, KSC-TR-43-2-V-2
Contract NAS10-8926

Three versions of rigid lid programs are presented: one for near field simulation; the second for far field unstratified situations; and the third for stratified basins, far field simulation. The near field simulates thermal plume areas, and the far field version simulates larger receiving aquatic ecosys-

tems. Since these versions have many common subroutines, a unified testing is provided, with main programs for the three possible conditions listed.

N80-26752/9 PC **A11**/MF **A01**
Miami Univ., Coral Gables, FL. School of Engineering and Architecture.
Three Dimensional Thermal Pollution Models. Volume 3: Free Surface Models.
Final Report.
S. S. Lee, and S. Sengupta. May 78, 231p
NASA-CR-154624-V-3, KSC-TR-43-2-V-3
Contract NAS10-8926
3.

Two sets of programs, named Nasum 2 and Nasum 3 are presented in detail. Nasum 2 is a far field formulation and is used without including the plant thermal discharge. Nasum 3 uses horizontal stretching to provide higher resolution at thermal discharge joints; and includes far field influences such as varying tides and ambient currents far from point of discharge.

N80-26883/2 PC **A11**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
The 1979 Southeastern Virginia Urban Plume Study (SEV-UPS): Surface and Airborne Studies.
J. H. White, W. C. Eaton, M. L. Saeger, R. B. Strong, and J. B. Tommerdahl. May 80, 239p
NASA-CR-159233, RTI/1816/01-F
Contract NAS1-15827

The operation of two surface monitoring stations (one in downtown Norfolk, Virginia, one south of the city near the Great Dismal Swamp) and the collection of 40 hours of airborne measurements is described. Surface site measurements of ozone, oxides of nitrogen, sulfur dioxide, temperature, dew point, b sub seat, and condensation nuclei were made. Instrument calibrations, quality assurance audits, and preliminary data analysis in support of the Urban Plume Study were also made. The air pollution problems that were addressed are discussed. Data handling procedures followed for the surface stations are presented. The operation of the aircraft sampling platform is described. Aircraft sampling procedures are discussed. A preliminary descriptive analysis of the aircraft data is given along with data or plots for surface sites, airborne studies, hydrocarbon species, and instrument performance audits. Several of the aircraft flights clearly show the presence of an urban ozone plume downwind of Norfolk in the direction of the mean wind flow.

N80-26884/0 PC **A04**/MF **A01**
National Research Inst. for Oceanology, Stellenbosch (South Africa). Coastal Engineering and Hydraulics Div.
Beach Sediment Sampling Methods.
L. Lenhoff. Aug 79, 75p CSIR-RR-366, ISBN-0-7988-1561-2

The sampling of beach sediments can be done in numerous ways and in many instances a choice of sampling method is made without considering the degree of accuracy which can be expected. Since the median grain diameter is a critical factor in many coastal engineering problems, the accurate determination of this parameter is of great importance. A standard sampling lay-out for the foreshore part of a beach profile is necessary in order to obtain a reliable estimate of the mean median grain diameter for coastal engineering application. Experiments were done on six test beaches which were selected on the basis of their different sediment characteristics. The results of different sample combinations were statistically analysed in order to determine the number of samples which is necessary to obtain a reliable estimate of the grain size within a given confidence band. The most significant conclusion which can be drawn is the recognition of two distinct grain size populations which are separated by the mid-tide line. A minimum of five samples is needed from each zone to obtain an acceptable estimate of the mean value of the median grain size. All the samples from the same zone may be combined into one composite sample to simplify the analysis. This implies that only two samples are obtained for each beach section, namely, one for the upper and one for the lower foreshore. Some sampling techniques which can be applied to simplify the sampling procedure were also evaluated. A number of recommendations with regards to these techniques are given.

ORNL/TM-6933 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
User's Manual to ABN0X: A Computer Program Designed to Simulate the Nitrogen Oxide Removal Efficiency of a Multistage Bubble-Cap Tower.
R. M. Counce. Sep 79, 49p
Contract W-7405-ENG-26

ABN0X is a computer program for simulating nitrogen oxide, NO/sub x/, removal from gas streams in a multistage bubble-cap column using water or dilute HNO sub 3 as the scrubbing liquor. The mathematical equations describing this scrubbing operation were developed from basic diffusional, kinetic, and equilibrium information and are in reasonable agreement with experimental data. The important mechanisms involved in the absorption of gaseous NO/sub x/ compounds with greater than 1 vol % NO sub 2 * (NO sub 2 + 2N sub 2 O sub 4) are: (1) the absorption of NO sub 2 * resulting in the production of liquid HNO sub 2 and HNO sub 3 ; (2) the dissociation of liquid HNO sub 2 into liquid HNO sub 3 and gaseous NO; and (3) the gas-phase oxidation of NO to NO sub 2 . This report gives a detailed description of this simulated scrubbing operation and the input necessary to operate the program. A listing of the computer code is given in the appendix. This report is based on an analysis of the experimental data reported in ORNL-5438. (ERA citation 04:053637)

ORNL-5657 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Options for the Collection and Disposal of Carbon Dioxide.
C. F. Baes, Jr., S. E. Beall, D. W. Lee, and G. Marland. May 80, 26p
Contract W-7405-ENG-26

If society should ever decide that unacceptable changes in climate are imminent because of the accumulation of carbon dioxide in the atmosphere from the use of fossil fuels, it may be necessary to collect and dispose of carbon dioxide. At present it appears that such disposal would consume a large fraction of the energy derived from the fossil fuel. To scrub and strip carbon dioxide from the flue gas of a coal-fired power station by the most efficient method presently available would require about 43% of the combustion energy of the coal. If the coal were burned in pure oxygen to avoid scrubbing and stripping, at least 30% of the combustion energy would be required to supply the oxygen. After recovery the best option for disposal of carbon dioxide is in the deep ocean where the low rate of circulation should give a retention time of hundreds of years. Injection could be in the form of a concentrated seawater solution and at a depth sufficient to prevent bubble formation. Such a stream could be denser than seawater and form a negatively buoyant plume that might convey much of the CO sub 2 to the bottom. Alternatively, liquid carbon dioxide could be injected into the ocean, but at greater depths to achieve the needed density. Or blocks of solid carbon dioxide hydrate or dry ice released at the ocean surface might reach deep water quickly enough for effective disposal. The most efficient option for the future might be floating, coal-fired power plants that use cold deep seawater for both condenser cooling and carbon dioxide disposal. In particular, it might be practical simply to compress the flue gas and discharge it at a depth which would insure that the CO sub 2 is dissolved and carried to the deep ocean. As a near-term option, depleted oil and gas fields could be used for disposal of carbon dioxide. (ERA citation 05:024036)

ORO-5076-4 PC **A03**/MF **A01**
Kentucky Univ. Research Foundation, Lexington.
Hot Gas Desulfurization. Progress Report.
J. T. Schrodt. Dec 77, 33p
Contract EY-76-S-05-5076

Desulfurization and regeneration tests were carried out this period in both the quartz and Inconel 601 metal reactors. Four gasifier ash sorbents, having inherent iron oxide contents ranging from 5 to 22 weight percents, were tested in fixed beds. The ash with the greatest iron content has the highest sulfur capacity, 420 grains H sub 2 S/lb of ash and the highest utilizable fraction of iron, 66 percent. Ash capacity increases slightly when the temperature is increased from 1000 to 1400 exp 0 F. At 800 exp 0 F all ashes show low capacities and very poor efficiencies. Three particle size fractions, 20/35, 10/20 and 4/8 were studied. The 4/8 size fraction has an efficiency of less than 0.65 at 15 percent breakthrough of H sub 2 S. Smaller size fractions have efficiencies of 0.8 to 0.9 in the temperature range 1000 to 1400 exp 0 F. Ash sorbents effectively remove H sub 2 S, COS and CS sub 2 at concentrations characteristic of producer gases. No GC-detectable concentrations of these sulfur compounds appear in the producer gases for long on-stream times. Fully sulfided ash sorbents were regenerated at 800 to 1200 exp 0 F and various space velocities of air. High O sub 2 efficiencies (0.8 to 0.95) at 15 percent breakthrough were determined. Sulfur is recovered in the pure form as well-as SO sub 2 . Some residual sulfur remains in the ash. Two models were developed and arranged in dimensionless form. One assumes reaction rate is controlled by gas-phase diffusion and uniform solid-phase chemical reaction, and the other assumes rate is controlled by gas-phase diffusion and pore diffusion with instantaneous chemical reaction at a solid product-reactant interface. Both models have exact and constant pattern solutions conducive to evaluation of the rate parameters. (ERA citation 05:021581)

PAT-APPL-6-025 639 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Energy Recovery System.
Patent Application,
A. S. Moore, and F. H. Verhoff. Filed 30 Mar 79, 14p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to an improved wet air oxidation system and method for reducing the chemical oxygen demand (COD) of waste water used from scrubbers of coal gasification plants, with this COD reduction being sufficient to effectively eliminate waste water as an environmental pollutant. The improvement of the present invention is provided by heating the air used in the oxidation process to a temperature substantially equal to the temperature in the oxidation reactor before compressing or pressurizing the air. The compression of the already hot air further heats the air which is then passed in heat exchange with gaseous products of the oxidation reaction for superheating the gaseous products prior to the use thereof in turbines as the driving fluid. The superheating of the gaseous products significantly minimizes condensation of gaseous products in the turbine so as to provide a substantially greater recovery of mechanical energy from the process than heretofore achieved. (ERA citation 05:025216)

PATENT-4 204 402
Not available NTIS
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Reduction of Nitric Oxide Emissions from a Combustor.
Patent,
R. A. Craig, and H. O. Pritchard. Filed 8 Sep 77, patented 27 May 80, 6p N80-26298/3, PAT-APPL-831 632
Supersedes PAT-APPL-831 632-77, N77-31260 (15 - 22, p 2912).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A turbojet combustor and method for controlling nitric oxide emissions by employing successive combustion zones is described. After combustion of an initial portion of the fuel in a primary combustion zone, the combustion products of the primary zone are combined with the remaining portion of fuel and additional plenum air and burned in a secondary combustion zone under conditions that result in low nitric oxide emissions. Low nitric oxide emissions are achieved by a novel turbojet combustor arrangement which provides flame stability by allowing stable combustion to be accompanied by low nitric oxide emissions resulting from con-

trolled fuel-lean combustion (ignited by the emission products from the primary zone) in a secondary combustion zone at a lower combustion temperature resulting in low emission of nitric oxide.

PB80-194285 PC **A04**/MF **A01**
Texas Transportation Inst., College Station.
Land Use Impact of Improving Section One of Farm-to-Market Road 157 in an Undeveloped Area of Arlington, Texas.
Research rept. Sep 76-Jul 79,
Pamela J. Cosby, and Jesse L. Buffington. Jul 79, 55p TTI-2-8-77-225-11, FHWA/TX-79-11
Prepared in cooperation with the Texas State Dept. of Highways and Public Transportation, Austin. Report on Economics of Highway Design Alternatives.

The report relates the findings of research done in an area of Arlington, Texas where a section of Farm-to-Market Road 157 was upgraded from a 24 foot two-lane road with a center stripe and open ditch to a 62 foot four-lane road with a continuous left turn lane and curbs and gutters. The improvement took place in an undeveloped area where most of the land was unimproved. Land use changes were analyzed for both abutting and non-abutting properties that might have been affected by the road improvement.

PB80-194319 PC **A04**/MF **A01**
Montana Cooperative Fishery Research Unit, Bozeman.
Environmental Effects of Western Coal Surface Mining. Part VI: Smallmouth Bass and Largemouth Bass in the Tongue River Reservoir, Montana, 1975-76.
Final rept.,
Russell F. Penkal, and Richard W. Gregory. May 80, 57p EPA-600/3-80-045
Grant EPA-R-803950
See also Part 5, PB80-186521.

Population parameters of smallmouth bass (Micropterus dolomieui) and largemouth bass (M. salmoides) were studied during 1975 and 1976, before expansion of surface coal mining adjacent to the Tongue River Reservoir in southeastern Montana. Reproductive success, as determined by alongshore seining, varied in different areas of the reservoir and may be correlated to turbidity. Population estimates were obtained at night during spring and fall 1976 with boat electrofishing gear. For yearling and older smallmouth bass the fall population of 13.0 fish/ha and the standing crop of 2.03 kg/ha represented 80 and 84 percent of the totals for basses in the reservoir. The largemouth bass population and standing crop during fall 1976 was 3.2 fish/ha and 0.32 kg/ha.

PB80-194368 PC **A12**/MF **A01**
Toledo Economic Planning Council, OH.
Warren-Sherman/Toledo Neighborhood Revitalization Plan, Toledo, Ohio.
Jun 80, 262p EDA-80-090
Grant EDA-06-06-18012
Prepared by City Venture Corporation, Minneapolis, MN.

The report has been a coordinated effort involving City Venture staff, leadership from the Warren-Sherman community, the City of Toledo's Department of Community Development and the Toledo Economic Planning Councils. It includes information on population, income, employment, social services, building conditions, housing tenure, traffic, land use and zoning. The report measures the economic, social and physical conditions in the Warren-Sherman neighborhood. The report contains a recommended course of action to deal with the problems.

PB80-194962 MF **A01**
Florida International Univ., Miami. Dept. of Physical Sciences.
Aerosol Source Characterization Study in St. Louis, Trace Element Analysis,
Kenneth A. Hardy. Feb 80, 199p EPA/600/7-80-025
Contract EPA-68-02-2406

The aerosol in St. Louis was sampled in July 1975 to better characterize the aerosol in an urban environment with moderate dispersion characteristics and heavy industrial activity. Two sampling sites were chosen, one in downtown St. Louis and a second close to the industrialized section in south St. Louis. Aerosol source coefficients show that the aerosol from the downtown site is primarily from coal (60-80%), cement dust (17%), steel manufacturing (6-7%) and auto emissions (3%). The aerosol from the industrialized site is primarily due to coal combustion products and dust (75%), and cement dust (15%), while auto emissions and heavy industrial processes account for about 5% of the aerosol mass. Determining the directional distribution of the aerosol trace elements allowed pinpointing of strong local sources.

PB80-195407 PC **A04**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Management of Air Quality in and Near Highway Tunnels. Executive Summary.
Final rept. Jun 74-Apr 79,
R. N. Schlaug. Jan 80, 53p FHWA-RD-78-186
Contract DOT-FH-11-8538
See also PB80-140007.

A comprehensive study was made of air quality management (AQM) practices applicable to highway tunnels for the purpose of improving the design and operation of tunnel ventilation systems. The study consisted of a review and analysis of current AQM practices, a field program in which air flow and air quality measurements were made in operating tunnels, theoretical analysis of the factors affecting tunnel air quality, the development of computer models of AQM systems, and use of the computer models to investigate alternate ventilation methods and to formulate AQM guidelines.

PB80-195423 PC **A03**/MF **A01**
Environmental Research Lab., Narragansett, RI.
Petroleum Hydrocarbons and Their Effects on Marine Organisms, Populations, Communities, and Ecosystems.
Journal article,
Jeffrey L. Hyland, and Eric D. Schneider. 1979, 43p EPA-600/J-79-095
Pub. in Sources, Effects and Sinks of Hydrocarbons in the Aquatic Environment, Proceedings of a Symposium, American University, Washington, DC, August 9-11, 1979, p464-504 1979.

Analysis of available data from bioassays conducted on adult stages of a wide variety of marine organisms reveals lethal effects from soluble fractions of petroleum and petroleum products. Strict control is suggested for oil development and related activities in certain shallow, highly productive, continental shelf regions, and in relatively confined, ecologically important wetlands and estuaries. Soft-bottom, coastal benthic communities are vulnerable to impact, and recovery from spilled oil could be relatively slow where oil tends to persist or where community stability is extremely low. Bird populations are highly susceptible to lethal and adverse effects, if contact with oil occurs. Local breeding populations of many organisms (including ichthyoplankton and meroplankton) may become heavily impacted, especially in certain confined coastal areas.

PB80-195431 PC **A03**/MF **A01**
New Jersey Dept. of Transportation, Trenton. Bureau of Operations Research.
New Jersey Concrete Median Barrier Delineation.
Final rept. Nov 77-Oct 79,
William L. Mullowney. Oct 79, 29p 80-008-7799, FHWA/NJ-80/007

A specification for a median barrier delineator developed in a previous research study was used on a four mile section of Route 80 in New Jersey. The installation was monitored over an 18 month period to study the durability of the mounting system, utility of the installation technique, and the nighttime visibility. Problems encountered with the mounting system were as follows: separation of the adhesive from the barrier surface, unusable concrete stud installations, incomplete or improper installation, and vandalism. The visibility of the delineators was studied at night under dry conditions. Observations were made about the number of devices visible on left and right hand curves, tangents, and lit areas. A pilot study was performed replacing the washer specified with a larger aluminum plate. After two months of observation no problems with the adhesive separating from the barrier were noticed. Recommendations of the use of a longer concrete stud, more intensive inspection and the use of a rivet to fasten the reflectors to the mount were made to combat some of the other problems encountered.

PB80-195597 PC **A21**/MF **A01**
Missouri Univ.-Rolla.
An Interdisciplinary Investigation of Environmental Pollution by Lead and Other Heavy Metals from Industrial Development in the New Lead Belt of Southeastern Missouri. Volume I.
Progress rept. (Interim) May 72-Jun 74,
Ernst Bolter, Nord L. Gale, Michael G. Hardie, Delbert D. Hemphill, and J. Charles Jennett. Jun 74, 484p NSF-RA-E-74-438
Grant NSF-GI-35981
See also PB-227 460.

This report describes a project that has developed research information, cooperation between industries and agencies, and applications of technology to control trace contaminants associated with lead production in southeast Missouri. This area is the largest lead producing district in the world; consequently, this study provides significant information on the magnitude, distribution, and impact of lead on the environment at the source of mining, milling, and smelting. The report presents data on air quality, heavy metal transport from fugitive sources, the efficiency of various smelter emission control devices, soil and geochemical studies, the relationship between humic acids and heavy metals, water quality, the cheap and effective meander treatment system for mini-mill waste, aquatic biology studies, accidents produced by smelters, vegetation, remote sensing techniques for detecting environmental problems, techniques for automated land use mapping, analytical facilities, storage and analysis techniques, and research experiments in the translocation of lead. A large portion of the report is illustrated with graphs, charts, and diagrams.

PB80-195613 PC **A03**/MF **A01**
Tye Engineering, Fairfax, VA.
Scour at Bridge Piers - Field Data from Louisiana Files.
Final rept. Aug 78-Jun 79,
Fred F. M. Chang. Jan 80, 38p FHWA-RD-79-105

Data from a total of 17 occurrences of scour at seven bridge sites in Louisiana were collected, covering the following ranges: Pier width, 3.4 - 10.4 m; flow depth, 1.7 - 19.5 m; flow velocity, 0.46 - 1.8 m/s; Froude number, 0.067 - 0.189; scour depth, 3.4 - 10.4 m, and bed material median diameter, 0.008 - 0.06 mm. An analysis of the relative scour depth with respect to relative flow depth for flows with Froude numbers about 0.1 shows that the scour depth increases rapidly with an increase in flow depth when the relative flow depth is less than 0.5. The rate of increase then slows down to approach a constant value of 0.8 maximum as the relative flow depth approaches 1.3 and may tend to decrease very slightly as the relative flow depth increases further. For the data where the Froude numbers were about 0.1, Shen's formula II(2) yields the best agreement. Three of the other popular formulas - Laursen's, Shen's formula I and Neill's approximation of Laursen's design curve - tend to overpredict the scour, and three formulas - Ingles-Poona's, Ahmad's and Chitale's - tend to underpredict the scour for these low Froude numbers.

PB80-196124 PC **A99**/MF **A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Proceedings of the International Technical Meeting on Air Pollution Modeling and Its Application (10th), Held at Rome, Italy on October 22-26, 1979.
Oct 79, 723p NATO/CCMS-108
See also 9th meeting, N79-27543. NATO furnished.

The growing energy demand in industrialized countries requires the construction of an increasing number of power plants fired with sulfur containing fossil fuels in already polluted areas. The construction of high stacks seemed to be the best solution. Standardized Gaussian models if at all suitable,

are not yet tested for an application to this problem. This document includes discussions and research findings of this problem.

PB80-196165 PC **A11**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
Analysis of Short and Long-Term Effects on Water Quality for Selected Highway Projects.
Final rept.,
Richard B. Howell, Don I. Nakao, and Jeffrey L. Gidley. Aug 79, 248p TL-657081, FHWA/CA-79/17

Research was undertaken at three highway construction projects in California to determine the influence on the water-quality environment. The projects were located on Interstate 5 in northern California at Dunsmuir, Route 395 in the high desert area north of Bishop, and on Interstate 5 in south Sacramento County. Each project involved contact with a live stream or river. Field data were assembled for the preconstruction and construction periods. The data show that the water-quality study performed by the districts as part of the environmental assessment process is adequate to describe potential impacts in qualitative terms.

PB80-196264 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Economics.
Environmental System Study on the Development of Fossil Fuel Resources in the Southwest.
Summary rept.,
James W. Sawyer, Jr. Aug 77, 16p NSF/RA-770904
Grant NSF-AER75-16163
See also report dated May 79, PB-300 526.

Alternative technologies currently or potentially available for producing energy and synthetic fuels from coal and oil shale in the Southwest are described.

PB80-196298 PC **A03**/MF **A01**
Denver, CO.
Economic Development in Denver: Overview of Urban Economic Development. Volume 1,
Elizabeth Orr, and Howard Converse. 1979, 27p

The report is the first of five technical reports prepared as part of the City and County of Denver's first year economic development planning program. The purpose is to describe the conceptual framework utilized by the Economic Development Policy Advisory Committee (EDPAC) and City staff to explore Denver's economic condition and assess what areas, if any, might be appropriate for local government action. The framework is called the urban life-cycle model. It was used by the EDPAC staff as an organizing device which, it was felt, could provide the Committee with an understanding of the implications of economic conditions which had been found to exist in Denver. By describing the stages of economic development through which all cities proceed and the factors which underlie this process, the model provides a descriptive basis for assessing any single city's present condition, the process by which it reached that state, and the possibilities for its future development.

PB80-196397 CP **T11**
Federal Highway Administration, Washington, DC.
Rural Highway Planning System.
Software,
Leon E. Litz, and Bennett Rutledge. 15 Sep 79, mag tape
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-196355, PB80-196363, and PB80-196371 (English), and PB80-196405 (Spanish).

An effective highway transportation planning process is the basis for, and is a necessary continuous part of, efficient highway transportation management. A series of manuals and accompanying computer programs were developed to provide guidelines for establishing a system and the basic data collection programs and analysis that are a necessary beginning for accomplishing such a planning process. This software package has been developed to analyze the data that will be collected by following the instructions described in the Road Inventory Traffic Surveys, and Adequacy Rating Manuals. The computer programs are described and documented in the 'Computer Program Users Manual', Vols. 1, 2 and 3. This battery of software includes 21, 7 and 12 programs for analyzing the road inventory, traffic survey, and adequacy rating data, respectively. Included with the computer programs are test data for each program and sample outputs which should be of great assistance while installing the programs. Programs included in the package provides means for storing, editing, and reporting such basic data. Special provisions have been made for easy conversion of titles to most foreign languages. Highway Log reports include Route Lengths, Mileage Summaries by pavement type, Summaries of highway structures, and Route logs. Adequacy reports include road adequacy ratings, and an improvement priority analysis. Traffic survey reports include peak hourly Volumes, Average daily traffic, Vehicle classification summaries, truck axle loading, and commodity flow analyses...Software Description: The Program is written in the COBOL -ANSI 74 programming language for implementation on a IBM computer using the OS/MVT 21.8F operating System. 126K bytes of core storage are required to operate the system.

PB80-196405 PC **E99**/MF **A01**
Federal Highway Administration, Washington, DC.
Lineamientos del Proceso de Planificacion del Transporte Vial (Outline of the Highway Transportation Planning Process),
Leon E. Litz, David Toillion, John Cutrell, Ronald Hall, and Bennett Rutledge. 1980, 370p
Text in Spanish. See also English version, PB80-196389. For system on magnetic tape, see PB80-196397.

An effective highway transportation planning process is the basis for, and is a necessary continuous part of efficient highway transportation management. This series of manuals and accompanying computer programs were developed to provide guidelines for establishing a system and the basic data collection programs and analysis that are a necessary beginning for accomplishing such a planning process. The following manuals are included: (1) Outline of the Highway Transportation Planning Process (2) Guide for a Manual of Instructions for Road Inventory (3) Guide for a Manual of Instructions for Traffic Surveys (4) Guide for a Functional Classification of Highways (5) Guide for a Manual for Highway Adequacy Rating and (6) Measuring Highway Improvement Needs and Priority Analysis.

PB80-196835 PC **A07**/MF **A01**
Maryland Univ., College Park. Water Resources Research Center.
Response of Corn (Zea Mays L.) and Soybeans (Glycine max L. Merr.) to Saline Aerosol Drift from Brackish Water Cooling Towers.
Doctoral thesis,
James Allen Armbruster. Oct 79, 149p SR-13, PPSP-CPCTP-31

Field experiments were conducted from 1973 to 1978 to investigate the saline aerosol tolerance to soil and foliar applied salt, and the effects of saline aerosol on net photosynthesis and leaf chlorophyll of corn and soybeans. Corn and soybean response to salt drift from an operating brackish water cooling tower in southern Maryland was also monitored. Tolerance to saline aerosols was examined with foliar applications of NaCl and brackish cooling tower water at total salt rates varying from 0 to 22.24 kg/ha/wk.

PB80-196843 PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Emission Standards and Engineering Div.
Wood Residue-Fired Steam Generator Particulate Matter Control Technology Assessment.
Oct 78, 25p EPA-450/2-78-044

This document presents the results of a performance review of particulate matter control systems on wood-fired steam generators. This review describes the industry, presents the characteristics of wood residue and particulate emissions, and discusses the control equipment and emission limits which represent Best Available Control Technology (BACT).

PB80-196850 PC **A14**/MF **A01**
Radian Corp., Austin, TX.
Stack Gas Reheat Evaluation.
Final rept. Jun 77-Feb 80,
W. R. Menzies, C. A. Muela, and G. P. Behrens. Mar 80, 315p EPA-600/7-80-051
Contract EPA-68-02-2642

The report gives results of technical and economic evaluations of stack gas reheat (SGR) following wet flue gas desulfurization (FGD) for coal-fired power plants. The evaluations were based on information from literature and a survey of FGD users, vendors, and architect/engineer (A/E) firms. The report summarizes SGR processes and their features and their commercial operating experience. It addresses benefits and energy requirements associated with SGR, and describes a developed method for estimating reheat costs. SGR can protect equipment downstream of a wet scrubber from corrosion, reduce the potential for acid rainout near the plant stack, preclude visible stack plumes, and reduce ground-level pollutant concentrations by increasing plume buoyancy.

PB80-196918 PC **A08**/MF **A01**
Radian Corp., Austin, TX.
Sources and Treatment of Wastewater in the Nonferrous Metals Industry.
Final rept. Oct 77-Jun 79,
Richard T. Coleman, J. David Colley, Robert F. Klausmeier, Nancy P. Meserole, and Wayne C. Micheletti. Apr 80, 174p EPA-600/2-80-074
Contract EPA-68-02-2608

This report describes the findings of an investigation on the sources and treatment of industrial wastewater containing metals. The study was performed to assess the existing database on metal containing wastewaters, investigate the state of development on the various treatment technologies being used, and determine whether this information could be applied to water treatment problems in the nonferrous metals industry. The results are being used within the Agency's Office of Research and Development as part of a larger effort to define potential environmental impact of emissions and effluents from this industry and the need for improved controls. The findings will also be useful to other Agency components and the industry in dealing with environmental control problems. The Metals and Inorganic Chemicals Branch of the Industrial Pollution Control Division should be contacted for additional information desired concerning this program.

PB80-197106 PC **A02**/MF **A01**
Martin Marietta Corp., Baltimore, MD.
Comparison Between Predictions of Two Gaussian Models (CRSTER and Modified CRSTER) and Measured SO2 Concentrations Near Tall Stacks Under Convective Conditions.
Final rept.,
Roger Brower. Jul 80, 17p PPSP-MP-32

The ability of two Gaussian plume models (CRSTER and modified CRSTER) to predict ground-level concentrations are compared. The modified model is found to be much more accurate in convective conditions, particularly because of a plume penetration feature.

PB80-197114 PC **A02**/MF **A01**
Kentucky Bureau of Highways, Lexington. Div. of Research.
Fatigue Damage of Flexible Pavements under Heavy Loads,
James H. Havens, Robert C. Deen, and Herbert F. Southgate. Apr 79, 25p RR-518

A modified Chevron N-Layer computer program has the capability of calculating the 'work' done by the total load on a given load group. Earlier analyses of AASHO Road Test sections and test vehicles had permitted the development of damage factor relationships. This paper presents seven, namely two-tire and four-tire single axles, tan-

dems, triaxles, and four-axle, five-axle, and six-axle groups. The two-tire axle (front or steering axle) has the most severe damage relationship. The 80-kN (18-kip) four-tire single axle was used as the reference axle and was assigned a damage factor of 1.0 for a specific amount of 'work'. Other axle arrangements and total loads producing that amount of 'work' were 63.6kN (14.3 kips) for the two-tire axle, 166.4kN (37.4 kips) for eight-tire tandems, 250.2kN (56.25 kips) for twelve-tired triaxles, 333.6kN (75.0 kips) for a sixteen-tired four-axle group, 415.0kN (93.3 kips) for a twenty-tired five axle group, and 496.4kN (111.6 kips) for a twenty-four-tired six-axle group.

PB80-197304 PC **A03**/MF **A01**
Carter Administration, Washington, DC.
Small Community and Rural Development Policy.
20 Dec 79, 47p

The document presents President Carter's Small Community and Rural Development policy, his policy statements and action agendas.

PB80-197338 PC **A03**/MF **A01**
Hawaii State Dept. of Transportation, Honolulu. Materials Testing and Research Branch.
Effective Methods of Establishing and Maintaining Vegetative Ground Covers for Highways in West Central Oahu.
Final rept. Jul 72-Jun 75,
Gary C. P. Choy, Leslie H. Imada, and Patrick I. Hironaga. Feb 79, 31p FHWA/HI-79/2
Color illustrations reproduced in black and white.

A study to test plant materials for use in highway landscaping was initiated in 1972. Various species were screened initially and nine selected for further study. Growth characteristics and nutrient requirements were observed. Results indicate that trailing gazania may be an acceptable alternative to the currently extensive use of wedelia.

PB80-197502 PC **A03**/MF **A01**
National Plant Materials Center, Beltsville, MD.
Evaluation of Woody Plants and Development of Establishment Procedures for Direct Woody Seeding and/or Vegetative Reproduction.
Executive summary,
J. H. Kimmons, R. B. Thornton, G. R. Lovell, R. F. Dudley, and H. W. Everett. Feb 80, 31p FHWA-MD-78-19A
See also PB-224 469. Sponsored in part by Maryland State Highway Administration, Brooklandville.

Literature reviews were made to prepare a list of 56 woody species to be evaluated. These species were evaluated in row seedings, row plantings, and large plots for ease of establishment, survival, and growth. Eight species are recommended for seeding. Hydroseeding has been the most successful method of establishment. Recommendations for establishment are presented. Successful row seedings were made with a direct mechanical seeder. A study of roadside succession on Maryland highway sites was made.

PB80-197692 PC **A10**/MF **A01**
Texas Univ. at Austin, Port Aransas. Marine Science Inst.
Proceedings of the Gulf of Mexico Coastal Ecosystems Workshop, Held at Port Aransas, Texas on September 4-7, 1979.
Final rept.,
Paul L. Fore, Russel D. Peterson, and Warren Paulich, Jr. May 80, 221p FWS/OBS-80/30
Contract DI-14-16-0002-79-152

Proceedings contain the formal presentations from the Gulf of Mexico Coastal Ecosystems Workshop, which was sponsored by the U.S. Fish and Wildlife Service. The purpose of the workshop was to provide information to coastal decision-makers on recent developments in coastal ecology related to assessing the impact of human activities on fish and wildlife resources.

PB80-197734 PC **A02**/MF **A01**
Minnesota Dept. of Transportation, St. Paul.
Use of Lug Anchors to Retard Pavement Movement.
Final rept.,
Stephan A. Oakey. Apr 80, 18p SPECIAL INVESTIGATION-355, FHWA/MN-80/1

The primary objective of this study was to determine whether concrete lug anchors retarded pavement movement on steep grades. Minnesota Department of Transportation's policy is that grades in the 3 to 5 percent and greater range are steep and may require lug anchors. Standard lug anchor spacing varies from 150 feet, center to center, for 3 percent grades to 75 feet, center to center, for 5 percent and greater grades. During the initial study of lug anchors on State Project 0702-49 it was observed that pavement settlement was occurring at these lug anchor locations. Settlement of up to 1-1/2 inches was observed. It was felt that this settlement was being caused by surface water entering the pavement structure, flowing in a down hill direction via the base aggregates, being trapped at the lug anchors and finally, due to traffic loads, being pumped out, thereby causing loss of base fines and some subgrade soil fines. End result was pavement settlement. Therefore, a second phase of this study, utilizing 2 inch perforated pipe to control surface water was initiated on S.P. 0702-51. This report covers both studies. Conclusions based on this study are: (1) that lug anchors do prevent the downhill movement of the concrete pavement; (2) that when lug anchors are used a perforated pipe system also be built to collect the surface water that enters the pavement structure thus eliminating the anticipated base pumping and pavement settlement.

PB80-198054 PC **A06**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Long-Term Behavior of a Prestressed I-Girder Highway Bridge in Champaign County, Illinois.
Civil engineering studies interim rept. Mar 72-Aug 79,
W. L. Gamble. Dec 79, 111p UILU-ENG-79-2019, STRUCTURAL RESEARCH SER-470, FHWA/IL-UI/180
Sponsored in part by Illinois State Dept. of Transportation, Springfield. Bureau of Materials and Physical Research. Report on Illinois Cooperative Highway and Transportation Research Program Ser-180.

This report describes the measured long-term behavior of a small prestressed concrete highway bridge. The three spans of about 46 ft (14.0 m) each were made with precast pretensioned I-section girders and a cast-in-place deck. Strains and camber were measured in the two instrumented girders for a period of 1067 days after transfer of prestress.

PB80-198062 PC **A10**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Impacts of Airborne Pollutants on Wilderness Areas Along the Minnesota-Ontario Border,
Gary E. Glass, and Orie L. Loucks. May 80, 201p EPA-600/3-80-044
Prepared in cooperation with Institute of Ecology, Indianapolis, IN.

The goal of this study was to examine previously unanswered questions concerning potential effects of the proposed Atikokan, Ontario power plant on ecosystems in the Boundary Waters Canoe Area Wilderness (BWCA) and Voyageurs National Park (VNP) of Minnesota by using the most relevant data and analytical methods. The principal steps were to focus on: (1) the ultimate deposition of emissions from the plant (rather than only on pollutant concentrations), (2) the use of a time-varying grid model with provision for atmospheric transformations, and (3) a detailed review of all available data from the region on atmospheric deposition of pollutants, water quality, and effects. The results are considered in relation to a review of responses by terrestrial and aquatic organisms to changes in the chemistry of this environment.

PB80-198120 PC **A09**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 2) - Effective Densities Calculated from Interpolated, Unmodified, Measured Normal Tractions.
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Feb 79, 192p FHWA-CA-SD-79-04

See also Volume 1, PB80-182470.

'Effective density' profiles were calculated from normal tractions interpolated between soil stress-meters at the outer periphery of the Cross Canyon, reinforced concrete culvert. 'Effective density' is the hypothetical density of an embankment material required to produce, under hydrostatic conditions, a measured soil stress under the measured overfill at the meter. Aside from the interpolations no adjustments have been made in the data. The normal tractions from which these 'densities' have been derived will not, in general, satisfy static equilibrium considerations in the pipe.

PB80-198203 PC **A09**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
Temperature Induced Stresses in Highway Bridges by Finite Element Analysis and Field Tests.
Final rept.,
Atalay Yargicoglu, and C. Philip Johnson. Jul 78, 197p CFHR-3-5-74-23-3F, FHWA/TX-78/01-23-3F
Prepared in cooperation with Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div. See also report dated Feb 77, PB-279 396.

This research focused on the application of finite element computer programs to the transient heat conduction and static stress analysis of bridge-type structures. The temperature distribution is assumed to be constant along the center-line of the bridge but can vary arbitrarily over its cross section. A computer program, TSAP, was developed for the prediction of the transient temperature distribution due to either daily variations of the environment such as solar radiation, ambient air temperature, and wind speed, or measured surface temperatures. This program, which also included thermal stress analysis based on elastic beam theory, was used extensively in this work to establish quantitatively typical magnitudes of temperature induced stresses for selected bridge types located in the state of Texas. Specific attention was given to the extreme summer and winter climatic conditions representative of the city of Austin, Texas. A static analysis program, SHELL8, which utilizes two-dimensional finite elements in a three-dimensional global assemblage with six degrees of freedom at each node point, was also developed to determine the thermally induced stresses and bridge movements. A concrete slab bridge was analyzed using this program to investigate skew and transverse behavior. Also, correlations between the field measured slope changes on two prestressed concrete bridges, and results that were obtained using the finite element programs, have been included.

PB80-198211 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
Detection of Voids Underneath Continuously Reinforced Concrete Pavements.
Research rept.,
John W. Birkhoff, and B. Frank McCullough. Aug 79, 57p CFHR-3-8-75-177-18, FHWA/TX-79/24-177-18
Prepared in cooperation with Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div. See also report dated May 77, PB-280 076.

The basic assumption in pavement design is that there is full support throughout the length of the pavement. When a void develops, this is not true. This report investigates three methods of detecting voids underneath continuously reinforced concrete pavements. The methods; deflection, pumping, and vibration, are evaluated to find which has the highest probability of successfully detecting voids. The deflection method is shown to be very reliable in predicting voids beneath CRCP and as such a detailed procedure for void detection using this technique has been outlined. The successful detection of such voids, by the method outlined in this report, can lead to the repair and subsequent restoration of pavements in which voids have developed. In this way, expensive major rehabilitation of pavements can be prevented.

PB80-198229 PC **A06**/MF **A01**
Hawaii Univ. at Manoa, Honolulu. Dept. of Civil Engineering.

Evaluating Falsework Stresses from Post-Tensioning.
Final rept. Mar 77-Oct 79,
Glenn H. Okada, and Harold S. Hamada. Oct 79, 108p CE-79-1, FHWA/HI-79/1
Sponsored in part by Hawaii State Dept. of Transportation, Honolulu.

The results of measurements and modelling studies on the falsework loads due to post-tensioning of two, two-span post-tensioned concrete box girder bridges are presented. Strain gages were applied directly to the shoring legs at both test sites and monitored during both the post-tensioning operation and the casting of superstructure concrete. Two modelling techniques, one using ICES STRUDL-II computer system and the other, Hetenyi's equations of beams on elastic foundations, were used to evaluate measurements. The conclusions from this study are: (1) After post-tensioning there is an increase in shoring loads at locations near the two end abutments and central support; (2) Large openings in the shoring network resulted in measured shoring loads which had large fluctuations in this neighborhood; (3) Shoring network designed to adequately support the concrete dead load will be sufficient in most cases to carry any additional load due to post-tensioning, however, it is recommended that similar analysis be made in the design of shoring structures.

PB80-198245 PC **A05**/MF **A01**
Montana State Univ., Bozeman. Dept. of Microbiology.
Environmental Effects of Western Coal Surface Mining. Part VII. Microbial Effect on the Quality of Leach Water from Eastern Montana Coal Mine Spoils.
Final rept.,
Patrick F. Kimble, and Kenneth L. Temple. May 80, 91p EPA-600/3-80-046
Grant EPA-R-803950
See also Part 5, PB80-186521.

Selected portions of test cores from the overburden of the West Moorhead coal deposit in southeastern Montana were examined for possible addition to leach water of toxic substances and for the presence of iron and sulfur bacteria which might contribute to leaching. Leachates were evaluated by measuring pH, lead, and the effect of the leachates on the Selenastrum algal assay.

PB80-198252 PC **A07**/MF **A01**
Acurex Corp., Mountain View, CA.
ACT (Available Control Technology) for Stationary NOx Sources.
Final rept.,
R. Mueller, H. Lips, C. Castaldini, K. Davis, and M. Herther. Dec 79, 150p 79-22/EE, EPA-909/9-79-002
Contract EPA-68-01-4142

Engineering evaluations of stationary source NOx controls were conducted and are reported here to support EPA Region IX in determining whether the NOx emission control rules in the EPA approved State Implementation Plan (SIP) and the recently submitted SIP revisions for the Los Angeles and San Diego areas represent an adequate level of NOx emission control for stationary sources. This report documents the following: A summary of the stationary source NOx emission control rules contained in the SIPs; 'Available Control Technology (ACT)' specifications for NOx sources in these areas; and a summary of NOx rules for other areas in the U.S. The ACT specification includes estimates of baseline and controlled emissions levels, the limitations and operational impacts, and the control costs associated with ACT. Sources considered include utility and industrial boilers, gas turbines, internal combustion engines, and industrial processes. Control technologies include several levels of combustion modifications and post combustion cleanup.

PB80-198260 PC **A05**/MF **A01**
Arkansas State Highway and Transportation Dept., Little Rock.
The Effects of a Channel Relocation Project on the Ecosystem of Little Sugar Creek, Benton County, Arkansas.
Final rept.,
Robert E. Tyler. Jun 79, 86p FHWA/AR-80/002
Prepared in cooperation with Arkansas Water Resources Research Center, Fayetteville.

The widening of U.S. 71 in Northwest Arkansas required that the Arkansas State Highway and Transportation Department relocate a portion of the channel of the Little Sugar Creek. A channel relocation project, in which careful channel construction and provisions for habitat were an integral part of the plan; was carried out and the effects monitored.

PB80-198427 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Application of Buoyant Mass Transfer Media to Hazardous Material Spills.
Final rept.,
G. W. Dawson, J. A. McNeese, and J. A. Coates. May 80, 48p EPA-600/2-80-078
Contract EPA-68-03-2204

A prototype system was designed and developed to slurry buoyant activated carbon into a static body of water. The process was developed to remove spilled soluable hazardous compounds from a watercourse. In a simulated spill, up to 98% removal of Diazinon, an organophosphorus pesticide, was achieved by adsorption on activated carbon and by dispersion of the spilled material. The basic system was barge-mounted with an intake pump, a jet-slurrier, a surge tank, and a slurry pump. The buoyant carbon was fed into the slurrier by gravity from a floating, hopper-bottom tote bin. Since no acceptable buoyant activated carbon is commercially produced in the United States at this time, a method of making buoyant activated carbon by using microballoons and a carbon coating mix was developed. Estimated cost per pound of media was $3.50 on a small-batch basis.

PB80-198435 PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Emission Standards and Engineering Div.
Standards Support and Environmental Impact Statement. Volume 2: Promulgated Standards of Performance for Grain Elevator Industry.
Apr 78, 92p EPA-450/2-77-001B
See also Volume 1, PB80-194152.

Standards of performance for the control of particulate matter emissions from new, modified, and reconstructed grain terminal elevators and certain storage elevators at grain processing plants are being promulgated under the authority of section 111 of the Clean Air Act. The promulgated standards will reduce uncontrolled particulate matter emissions by more than 99 percent and will reduce particulate matter emissions by 70 to 90 percent compared to emission limits contained in typical state or local air pollution regulations. An analysis of the significant changes in the environmental and economic effects associated with the promulgated standards is included in this document.

PB80-198443 PC **A05**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Rookgasontzwaveling (Flue Gas Desulphurization).
R. Bosma. May 79, 81p ESC-2
Text in Dutch, summary in English.

The NATO Committee on the Challenges of Modern Society (CCMS) performed a study on existing Flue Gas Desulphurization Processes. In addition to a description of the processes itself data have been collected on cost, efficiency, availability, energy losses and applicability. The results have been published in twelve technical reports on the following processes: limestone/sludge, lime/sludge, double alkali/sludge, seawater scrubbing, limestone/gypsum, lime/gypsum, double alkali/gypsum, dilute sulfuric acid/gypsum, sodium sulphite, magnesium oxide, carbon adsorption and copper oxide.

PB80-198450 PC **A21**/MF **A01**
Environmental Protection Agency, Washington, DC. Grants Administration Div.
Research, Demonstration, Training, and Fellowship Awards: April - September, Fiscal Year 1978.
1979, 497p
See also report for October 1977-March 1978, PB-289 857.

Section I lists research, documentation, training, and fellowship awards by State, program, and grantee name. Each record provides applicant name, municipality, program element, title, project director, grant identification number, type of grant award, date and dollar amount of award. Section II contains brief project descriptions for research and demonstration projects administered by Headquarters and is arranged in ascending order by the grant identification number. An index is provided for cross-referencing the information between Sections I and II.

PB80-198492 PC **A15**/MF **A01**
National Environmental Engineering Research Inst., Nagpur (India).
Research Programmes in Environmental Engineering and Science in India,
B. B. Sundaresan, S. K. Kesarwani, and S. G. Bhat. 1978, 327p

This publication provides information about the ongoing research projects in the field of Environmental Engineering and Science in India. It contains information on 462 research projects carried out by abut 893 scientists working in different organizations.

PB80-198682 PC **A08**/MF **A01**
JHK and Associates, Alexandria, VA.
Measures of Effectiveness for Multimodal Urban Traffic Management. Volume 2. Development and Evaluation of TSM (Transportation Systems Management) Strategies.
Final rept. Mar 77-Sep 79,
Charles M. Abrams, and John F. DiRenzo. Dec 79, 171p FHWA-RD-79-113
Contract DOT-FH-11-9246
Prepared in cooperation wih Peat, Marwick, Mitchell and Co., Washington, DC.

This three-phase study has developed measures of effectiveness (MOE'S) for Transportation Systems Management (TSM) strategies. In Phase I, hierarchical schemes of TSM strategies and tactics and comprehensive goals and objectives were developed. MOE'S were then identified which could measure the degree of attainment of each related objective through the implementation of a given tactic. Data sources, field measurement procedures and modelling techniques were then identified for measuring or estimating each MOE. In Phase II four case studies were conducted to test and illustrate the methodology and to demonstrate the effectiveness of a variety of TSM strategies. In Phase III sampling and data collection procedures for some of the most commonly used MOE'S were developed. Also, manual and computer modeling procedures for modal split and network analysis were studied and recommendations on their applicability to TSM analyses were developed. This volume has been written as a stand-alone guide for practicing engineers and planners who are engaged in the development and evaluation of urban area TSM plans. The guide provides a consistent framework for TSM strategy development, recommends measures of effectiveness for TSM strategy evaluation and identifies and demonstrates manual and computer techniques for TSM analysis.

PB80-198807 PC **A04**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
Variations in Skid Resistance Over Time. Part I.
Final rept.,
Stephen N. Runkle, and David C. Mahone. Feb 80, 58p VHTRC-80-R33, FHWA/VA-80/33
Sponsored in part by Virginia Dept. of Highways and Transportation, Richmond.

The purpose of the project was to quantify the magnitude of changes in skid resistance over time, to isolate the variables that seem most important with respect to the changes, and, to the degree possible, formulate a model for converting skid resistance values obtained under a given set of conditions to the values that would be measured under a different set of conditions. The Virginia Department of Highways and Transportation survey skid trailer, the Department's research trailer, the research stopping distance car, and the grease patch method of measuring surface texture were evaluated with respect to time- and weather-dependent changes in measured values. The grease

patch method of measuring texture seems to have the same basic relationship to weather variables as does the Department's survey trailer, but the relationship is consistent among sites. Also, the use of this method is time consuming and expensive. The research trailer experienced so many breakdowns that the researchers place little confidence in the results obtained with this testing device. For the stopping distance car it was found that the average standard deviation for all test speeds on the six sites tested was 3.26 skid numbers. For the Department's survey skid trailer it was found that adjustments could be made to measured values to predict values for times other than when the measurements were made, either by evaluating weather variables or using specified correction values for designated months.

PB80-198831 PC **A04**/MF **A01**
Texas Transportation Inst., College Station.
Land Use Impact of Improving Collins Street in a Developed Area of Arlington, Texas.
Interim rept. Sep 76-Sep 79,
Pamela J. Cosby, and Jesse L. Buffington. Sep 79, 51p TTI-2-8-77-225-13, FHWA/TX-79/27+225-13
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin.

The report relates the findings of research done in an area of Arlington, Texas where a section of Collins Street was upgraded from a 40 foot, two-lane road with parallel parking and curbs and gutters to an 84 foot, six-lane road with a continuous left turn lane and curbs and gutters. The improvement took place in a developed area where the predominant land use was residential. Land use changes were analyzed for both abutting and nonabutting properties that might have been affected by the road improvement. Causes of development in the area other than the street improvement were also researched and are reported. Highway planners should be able to use this report and subsequent reports of this study to make more accurate predictions of land use changes due to specific highway improvements.

PB80-198872 PC **A10**/MF **A01**
PEDCo-Environmental, Inc., Kansas City, MO.
Digest of Ambient Particulate Analysis and Assessment Methods.
Final rept.,
James A. Throgmorton, and Kenneth Axetell. Sep 78, 208p EPA-450/3-78-113
Contract EPA-68-02-2603

A compendium of techniques is provided which describes approximately 25 techniques for analysis and interpretation of ambient particulate data. The techniques can be grouped categorically as follows: Temporal Patterns; Spatial Patterns; Meteorological Effects; Emissions Assessment; Interpreting Chemical, Elemental and Morphological Data; and Interpreting Particle Size Data. The techniques are described briefly, and references for a more thorough treatise of the subject are provided. The techniques span a range of complexity, cost and effectiveness. They are evaluated in terms of cost effectiveness and resource requirements. The digest provides the user with guidelines on the use of the techniques in terms of their problem applicability, resource requirements and interrelationships. It provides a framework for designing studies or analyses to interpret data from ambient particulate or any similar pollutant.

PB80-198997 PC **A04**/MF **A01**
RRC International, Inc., Latham, NY.
Systems Approach to Beach Protection for Oil Spill Incidents. Phase I. Feasibility Study,
Paul E. Bakeman, Jr., and Albert L. Armstrong. Oct 75, 56p
Grant EPA-R-803087-01

This report is a product of the above efforts. The beach protection system studied in this program is designed to limit the environmental damage caused by oil spills originating from oil exploration, production and transportation. A sorbent-based beach protection system has been investigated and tested for deployment on shorelines and within the intertidal zones of beaches.

PB80-199011 PC **A13**/MF **A01**
Evaluation Research Associates, Inc., Austin, TX.
Texas Traffic Safety Program Evaluation (1972).
Feb 74, 292p
Sponsored in part by Texas Governor's Office of Traffic Safety, Austin, and Department of Transportation, Washington, DC.

The purpose of this document is to evaluate the Texas Traffic Safety Program for the 1972 Federal Fiscal year and to provide an Annual Report on that program. The Evaluation is based on the Texas Annual Highway Safety Work Program for the Federal Fiscal Year 1972, prepared by the Texas Traffic Safety Administration. The 1972 Annual Highway Safety Work Program described the overall plan for achieving the objectives of the Texas Traffic Safety Program; this Evaluation analyzes that program to determine its actual achievements. Specific tasks which are included in the Evaluation consist of the following: (1) determination of the fiscal status of each project undertaken during the 1972 fiscal year; (2) determination of the current status of each project to reveal actual achievements versus planned achievements; (3) determination of the comparative status of the State with regard to progress made in reducing the number of traffic crashes; (4) determination of the State's degree of compliance with the National Standards; (5) determination and analysis of the current funding trends by addressing Federal, State, and local funds currently being expended for traffic safety in Texas; and (6) submission of recommendations on the basis of the foregoing information for optimal utilization of funding sources in reducing traffic crashes in the State.

PB80-199359 PC **A05**/MF **A01**
Department of Agriculture, Beltsville, MD.
Manual for Composting Sewage Sludge by the Beltsville Aerated-Pile Method.
Final rept.,
G. B. Willson, J. F. Parr, E. Epstein, P. B. Marsh, and R. L. Chaney. May 80, 83p EPA-600/8-80-022

In producing clean water from sewage, wastewater treatment plants also produce sludge. Most of the commonly used methods to dispose of this material are now considered to be either environmentally unacceptable, wasteful of energy, or very expensive. To ease this situation, a relatively simple, rapid, and inexpensive sludge composting process has been developed. The method makes possible the conversion of undigested sludge into a composted product that is aesthetically acceptable and meets environmental standards. The material has demonstrated usefulness as a soil amendment stimulative to plant growth. If relatively simple control procedures are followed, the compost appears to be free of primary human pathogens because of the lethal effect of heat generated during the composting process on such organisms. The composting procedure represents a major advance over previously known composting methods. It is adaptable to practical use in municipalities of widely varying size. In many situations its short startup time will allow its use as an emergency interim solution for sludge management. Key information is presented on the economics of the process, and on the marketing and use of the product as a soil conditioner to improve plant growth.

PB80-199367 PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Policy Analysis.
Would Declaring Federal Smog Days Reduce Automobile Travel in the Washington, DC. Area: The Results of a Survey of Travel by EPA Employees on April 19, 1976,
Joel Horowitz. Nov 76, 19p EPA/400-11/76-002

It is sometimes suggested that the intensity of smog episodes in the Washington D.C. area could be reduced by asking Federal employees in the area not to go to work on days forecast to be smoggy, thereby reducing the volumes of automobile travel and emissions during smog episodes. Estimates of the reduction in automobile travel that might be achieved suggest that declaring a Federal smog day might reduce Federal employee automobile trips by 18 to 42 percent and Federal employee vehicle miles traved by 37 to 50 percent.

PB80-199375 PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Policy Analysis.
Transit Requirements for Achieving Large Reductions in Los Angeles Area Automobile Travel,
Joel Horowitz. Nov 76, 79p EPA/400-11/76-001

The paper describes the structure and application of a model for estimating aggregate supply characteristics of bus transit systems that are capable of carrying substantial fractions of the person trips in a urban area. Given the number and geographical distribution of trips that must be carried on transit, the model enables a range of transit options for carrying these trips to be developed. Each option is characterized by the number of buses it requires, the geographical area served by transit, the transit schedule frequency, the transit mode split that must be achieved in the transit service area, average transit travel time and cost per trip, and the average travel time and cost that would result if bus travelers used automobiles.

PB80-199540 PC **A06**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Role of Rill Development in Salt Loading from Hillslopes.
Master's thesis,
Ginger K. Sunday. 1979, 120p W80,-05752, OWRT-B-170-COLO(2)
Contract DI-14-34-0001-8067

A field study, a computer simulation, and flow velocity experiments were used to identify the major contributing factors in salt loading of the Colorado River from hillslopes above the river. The field study of artificially induced runoff over Mancos shale was conducted on sites with little vegetation located north of the Grand Junction, Colorado, airport and in the West Salt Creek Basin near Mack, Colorado. The longitudinal slopes ranged from 7 to 41 degrees with lengths of from 40 to 225 feet.

PB80-199565 PC **A04**/MF **A01**
Kentucky Water Resources Research Inst., Lexington.
Proceedings of Symposium on Water Resources Research in Kentucky, June 2-3, 1980,
Ralph R. Huffsey. Jun 80, 63p W80-05751, OWRT-A-999-KY(4)
Sponsored in part by Office of Surface Mining Reclamation and Enforcement (DI), Washington, DC., Geological Survey, Reston, VA., and Kentucky Geological Survey, Lexington.

Abstracts of 45 papers presented at the proceedings, symposium on water resources, are given. Information provided for each paper includes title, location, principal investigator, agency, period of project, objective, and present work and accomplishments. References are provided with some of the abstracts. Topics covered by the papers include: water resources data, water quality--biology, groundwater, modeling, water quality--management planning, water quantity and water quality--mine water.

PB80-199615 PC **A07**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Abt. Strassenbau.
I. Verkehrsablauf an Einkaufszentren und Verbrauchermarkten. II. Gesetzmassigkeiten des Verkehsaufkommens in Sonderfallen (I. The Flow of Traffic in Shopping Centres and Consumer Markets. II. Characteristics of the Development of Traffic Volumes in Special Cases),
Klaus Janz, and Hoger Geiss. 1976, 138p
Pub. in Forschung Strassenbau und Strassenverkehrstechnik, heft 217, 1976. Text in German, abstracts in English and French. Prepared in cooperation with Technische Hochschule, Darmstadt (Germany, F.R.), and Technische Univ., Brunswick (Germany, F.R.).

The first involved the monitoring of traffic flows to and from five shopping centers. Consideration is given to such variables as time of day, day of the week, shopping center sales volume, etc. Traffic-relevant customer behavior is also analyzed. Results are presented with the aid of numerous charts and tables. The second study involved traffic volumes at four shopping centers and three recreational areas. The characteristic features of the

customers of visitors was derived, the time distribution of the daily volume of traffic was determined, the influence of additional traffic on the approach roads and neighboring junctions was estimated, and a delimitation of the catchment area was performed. Recommendations are given for the size of the parking areas for shopping centers and recreational centers.

PB80-199623 PC **A06**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Abt. Strassenbau.
Untersuchung uber den Einfluss der Fahrstreifenbreite auf den Verkehrsablauf auf Richtungsfahrbahnen (Investigation of the Influence of Lane Width on the Flow of Traffic on Roads with Separate Carriageways),
Freidrich-Wilhelm Oellers. 1976, 108p
Pub. in Forschung Strassenbau und Strassenverkehrstechnik, heft 211, 1976. Text in German, abstracts in English and French. Prepared in cooperation with Ingenieurbuero, Aachen (Germany, F.R.).

In the Federal Republic of Germay the autobahns and Federal highways are as a rule built with a lane width of 3.75 m. Since 1974 guidelines permit also a reduced autobahn cross-section with a lane width of 3.50 m. Hitherto there has been no quantitative information available on the introduction of the reduced cross-section concerning the influence of lane width on traffic flow and traffic safety on roads with separate carriageways. Test sections were selected for the investigation, whichwith traffic-lane widths of 3.25 m, 3.50 m, and 3.7 m - each had a cross section with and without emergency lane (hard shoulder). With the aid of combined photographs and tape recordings traffic measurements were performed on the selected stretches, covering the distribution of local speeds, the overall time intervals, traffic density and composition, and the behavior of drivers in respect of lateral distances for each traffic lane. The influence of the lane width on traffic flow characteristics and on the behavior of drivers in respect of lateral distances was investigated by means of multiple regression and correlation analyses.

PB80-199664 PC **A06**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Abt. Strassenbau.
Grenz-und Folgezeitlucken als Grundlage fuer die Berechnung der Leistungsfahigkeit von Landstrassenknoten (Critical Time Gaps and Following Time Headways as the Basis for Calculating the Throughput Capacity of Main Road Junctions),
Jurgen Harders. 1976, 112p
Pub. in Forschung Strassenbau und Strassenverkehrstechnik, heft 216, 1976. Text in German, abstracts in English and French. Prepared in cooperation with Ingenieurbuero, Duesseldorf (Germany, F.R.).

The first part of the work deals with the problems of definition of critical time gaps and following time headways, measuring regulations, and evaluation processes. The existing processes are further developed and completed; the most important complement is the derivation of a relationship that allows a determination of the mean error in a critical time gap measured. In the second part of the work the relationships between critical time gaps and following time headways are discussed for various types of vehicle and movement processes, as is the dependence of these values on external influences. On the basis of the relationships obtained a table of critical time gaps and following time headways is established, which can provide the starting parameters for calculating the throughput capacity of junctions without traffic lights.

PB80-200090 PC **A08**/MF **A01**
Montana Water Resources Research Center, Bozeman.
The Libby Dam Project: An Ex-Post Facto Analysis of Selected Environmental Impacts, Mitigation Commitments, Recreation Usage and Hydroelectric Power Production.
Final rept.,
Vito A. Ciliberti, Jr. Apr 80, 151p MWRRC-106, W80-05794, OWRT-A-106-MONT(1)
Contract DI-14-34-0001-8028
Prepared in cooperation with Montana Univ., Missoula. School of Forestry.

Water impoundment projects generally impact the river below the dam. Frequently the construction contract provides for mitigation of adverse impacts. The Libby Project, authorized primarily for hydro-electric power generation and flood control and to provide navigation and recreation as secondary benefits, caused the inundation of a biggame winter range, the relocation of a railroad and a highway in addition to damming a river. The Army Corps of Engineers in cooperation with the Montana Department of Fish and Game and others engaged in a number of wildlife mitigation projects.

PB80-200116 PC **A08**/MF **A01**
Vermont Univ., Burlington. Dept. of Geology.
Preliminary Assessment of Different Methods for Bedrock Water Well Location and Evaluation.
Technical completion rept. 1 Oct 77-30 Sep 79,
W. Philip Wagner. 1 Oct 79, 173p W80,-05792, OWRT-A-030-VT(1)
Contract DI-14-34-001-9048

The purpose of this study is to evaluate the use of a proton precession magnetometer for locating fractures in bedrock having a potential for high yield water wells, and geophysical bore hole logging (caliper, electric, and gamma ray) of wells to assess their profile characteristics and the possibility for guiding modifications intended to produce higher yields. Field testing of more than 21 different sites with the magnetometer and 23 individual wells provided extensive data from different geologic, hydrologic, and man-made conditions.

PB80-200546 PC **A99**/MF **E02**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Process Design Manual for Sludge Treatment and Disposal.
Technology transfer series.
Sep 79, 1135p EPA-625/1-79-011
Supersedes PB-259 151.

The purpose of this manual is to provide the engineering community and related industry with a new source of information to be used in the planning, design, and operation of present and future wastewater pollution control facilities. This manual supplements this existing knowledge by describing new treatment methods and by discussing the application of new techniques for more effectively removing a broad spectrum of contaminants from wastewater.

PB80-200611 PC **A08**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Abt. Strassenbau.
Verkehrsbeeinflussung durch Wechselverkehrszeichen (Traffic Control by Means of Variable Message Signs),
Hanfried Albrecht. 1976, 167p
Pub. in Forschung Strassenbau und Strassenverkehrstechnik, heft 206, 1976. Text in German, abstracts in English and French. Prepared in cooperation with Buero fuer Verkehrstechnik und Datenverarbeitung, Aachen (Germany, F.R.).

In urban areas it is generally not possible to increase the amount of space available to traffic, and there are limits to the way in which traffic can be controlled with light signals. At periods when the system is overloaded, with the attendant increased risk of accidents and increased air pollution, other traffic control measures must be taken to relieve or redistribute the traffic flow. For this purpose one can use variable traffic signs which are switched on only in the rush hours. Thus, detours can be avoided during off-peak pericds. The theoretical considerations are clarified by means of examples. The system is applied to the town of Aachen in an attempt to see what extent the individual measures are sensible and can help to reduce the weak points shown by the analyses. Within the framework of a partial strategy in a section of the network data obtained in 'before and after' measurements are used to check the effects of the control measures. The most important results are that the degree of compliance could be calculated as 7.1% and the journey time saved on the alternative as compared with the standard route was 24%. It appears that also in urban networks and with relatively simple means recommendations can produce successful resuits.

PB80-200629 PC **A05**/MF **A01**
Bundesministerium fuer Verkehr, Bonn-Bad Godesberg (Germany, F.R.). Abt. Strassenbau.
Untersuchungen zur Signalfolge an Knotenpunkten (Study of Traffic Light Sequence at Intersections),
Wolfgang Androsch. 1976, 85p
Pub. in Forschung Strassenbau und Strassenverkehrstechnik, heft 200, 1976. Text in German, abstracts in English and French. Prepared in cooperation with Technische Hochschule, Darmstadt (Germany, F.R.).

Part I of the study is concerned, under the heading of 'The Problem of Transition Time When Starting at Intersections Having Traffic Lights' with the effect of the transition on the capacity, on traffic safety, and on starting operations, seen under the aspect of economical driving. The researches are based on deterministic analyses of models and empirical investigations, in which the distance-time of approximately 5700 vehicle queues have been evaluated. In Part II of the study, under the heading of 'Investigations of the Traffic Light Sequence at Pedestrian Crossings' the relationships between the information content of a given traffic light sequence and the position of the traffic light itself, relative to the location of the crossing zone, is examined. The question on whether pedestrians should be guided by two-or-three-phase signal sequences is investigated with the aid of behavioral analysis.

PB80-201080 PC **A02**
Florida Univ., Gainesville. Coastal and Oceanographic Engineering Lab.
Inlet Sand Bypassing Systems in Florida,
Christopher P. Jones, and Ashish J. Mehta. Jan 80, 12p NOAA-80052705
Grant NOAA-04-7-158-44046
Pub. in Shore and Beach, v48 n1 p25-34 Jan 80. Prepared in cooperation with Suboceanic Consultants, Inc., Naples, FL.

The stabilization of a tidal inlet can interfere with the natural by-passing of sedimentary material at the inlet and result in increased shoaling of the navigation channel as well as accelerated erosion of beaches adjacent to the inlet. Several sand bypassing systems have been utilized for the purpose of alleviating these problems, although they have met with varied degrees of success. Some of the bypassing methods employed at tidal inlets in Florida are described, emphasizing their history, economics, and effectiveness. The State's role in sand bypassing has been summarized. Nine inlets, seven on the Atlantic coast and two on the Gulf of Mexico have been included in this study. These are the Florida inlets where means of sand transfer are employed on a continuous or periodic basis.

PB80-201163 PC **A05**/MF **A01**
Anderson Notter Finegold, Inc., Boston, MA.
Recycling Historic Railroad Stations: A Citizen's Manual,
Margo B. Weber, and Paul J. McGinley. Nov 78, 93p
Contract DOT-OST-77-002
See also Technical Supplement, PB80-201171.

The Manual represents the culmination of a study funded by the Department of Transportation to evaluate eight historic railroad stations which have been preserved and adapted for new uses. The purpose of the manual is to assist individuals as well as local government officials, preservationists, architects and developers interested in undertaking railroad station recycling projects in their own communities. The publication discusses basic guidelines for successful projects, and feasibility. Emphasis is placed on the economic feasibility of adaptive reuse of historic stations. The manual raises issues which must be resolved during the reuse process and poses possible solutions to these issues as they apply to particular types of projects. The potential is also addressed for the inclusion of intermodal transportation centers in recycled stations. The manual is a useful guide not just for preservationists and planners but also for all readers who desire to make better use of existing resources in their communities.

PB80-201171 PC **A07**/MF **A01**
Anderson Notter Finegold, Inc., Boston, MA.

Recycling Historic Railroad Stations: A Technical Supplement to the Citizen's Manual. Reuse of Historically and Architecturally Significant Railroad Stations for Transportation and Other Community Needs: Documentation, Analysis, Evaluation.
Technical rept. Sep 77-Jun 78,
Margo B. Webber, and Paul J. McGinley. Nov 78, 133p
Contract DOT-OST-77-002
See also Citizen's Manual, PB80-201163.

The report provides the detailed documentation, analysis and evaluation of eight historic and architecturally significant railroad stations which have been adaptively reused and recycled for transportation and other community uses. Over 20,000 vacant or underutilized railroad stations represent a vast potential for economically viable adaptive reuse projects. The report is for use by preservationists, architects, developers, planners, government officials and citizen groups who are seriously interested in undertaking railroad station recycling in their own communities. A case study approach is used to present the technical information on the eight reuse examples. Four major areas of study are developed in the report: architectural and rehabilitation design analysis; market and financial strategies; transportation planning; urban revitalization and community participation.

PB80-201494 PC **A02**
Louisiana State Univ., Baton Rouge. Div. of Engineering Research.
Using Enhanced Landsat Images for Calibrating Real-Time Estuarine Water-Quality Models,
J. M. Hill, and D. S. Graham. Jan 80, 6p NOAA-80052706
Grant NOAA-04-158-44046
Pub. in Water Quality Bulletin, v5 n1 p20-23 Jan 80. Prepared in cooperation with Florida Univ., Gainesville. Dept. of Civil Engineering.

Water quality models are being developed faster than the ability to acquire input data. Landsat data can, therefore, be effectively used to: Delineate characteristic boundaries of various influent source waters; Design the appropriate finite-element grid system; Construct and calibrate a water quality model by providing appropriate ranges of dispersion coefficients; and Verify model outputs through use of various computer overlay techniques with satellite-derived water quality distributions.

PB80-201924 PC **A10**/MF **A01**
Missouri Univ.-Rolla. Dept. of Civil Engineering.
A Model Study of a Synthetic Fabric Material for Use as a Slope Protection Method on Irrigation Dams.
Master's thesis,
Larry Dwayne McCallister. 1979, 207p W80,-05806, OWRT-B-124-MO(1)

A three phase program involving laboratory and field investigation was used to test a new synthetic fabric, Acrilan, designed to be used in the form of soil-filled 'sand-pillows' for reservoir bank or slop protection from wave erosion. Irrigation reservoirs in the Midwest often have severe erosion problems due to the lack of quality control during construction, the flat topography with little wind shelter, and the fine-grained quality of the soil. Acrilan has several advantages over other slope protection materials: (1) outstanding biodegradation and ultraviolet light resistance, (2) ease and economy of installation, (3) ease of repair, and (4) excellent cost/benefit relationships. The sand pillow system with Acrilan was modeled to evaluate the parameters that affect the stability of the pillows when placed on an embankment slope. Modeling results were used to develop design criteria for the individual pillows. Soil retention ability of the fabric was tested by laboratory immersion tests where the fabric was subjected to constant wave action. The field tests were conducted on a pump-in irrigation dam in north central Missouri. Erosion rates of unprotected sections were compared with rates on protected sections of the same embankment. Results show that sand pillow stability is primarily a function of wave height, wave period, embankment slope angle, and pillow weight. The sand pillow method offers excellent slope protection, however, due to loss through the fabric, some limiting minimum particle size specification is needed.

PB80-204084 PC **A02**/MF **A01**
New York Sea Grant Inst., Albany.
Beach Use and Water Quality in New York City,
Charles Heatwole, and Niels West. Feb 80, 25p
NYSG-RS-80-02, NOAA-80052715
Prepared in cooperation with Hunter Coll., New York. Dept. of Geology and Geography, and Rhode Island Univ., Kingston.

New York City's 16.9 miles of public beach are heavily used now and will attract even more users in the years ahead. Crowding occurs despite safe, but generally unsatisfactory water quality. The major goal of Project 208 (Waste Treatment Management Plan) is to eliminate the sources of pollution and open new beach areas. This paper focuses on the implication Project 208 might have for swimming and beach use in the New York City area.

PB80-206014 PC **A05**/MF **A01**
Bend Research, Inc., OR.
Industrial Water Reuse with Coupled Transport Membranes.
Final rept.
Sep 79, 96p W80-06033, OWRT-C-80139-R(8802)(1)
Contract DI-14-34-0001-8802

The objective of this program is to develop coupled transport membranes for the treatment of industrial wastewaters, allowing water reuse. Several meta-containing waste streams from the primary metals industry were identified as potential candidates for the application of coupled transport membranes. These membranes consist of a liquid ion-exchange agent constrained within the pores of a microporous polymeric support, forming a liquid membrane. Coupled transport was successfully demonstrated with flat sheet membranes for synthetic rinse solutions of chromium, zinc, and copper. Chromium was concentrated by a factor of nearly 10,000 from a dilute feed solution to a concentrated product solution, indicating excellent potential for recovery of a concentrated product. The composition of the diluent used to dilute the liquid ion-exchanger in the membrane had a major effect on the metal ion flux. The flux-limiting step in metal transport was determined to be membrane diffusion, rather than reaction kinetics. The most promising metal waste stream applications were also studied with hollow fiber membranes, which comprise a more favorable geometry for industrial application of coupled transport. Chromium and zinc exhibited the highest fluxes. The economics of coupled transport membranes for the recovery of metal values and reuse of rinse waters appears to be favorable.

PB80-207301 PC **A05**/MF **A01**
Bend Research, Inc., OR.
Research on Novel Solvent Extraction Systems for Industrial Water Reuse.
Final rept.
Oct 79, 95p W80-06032, OWRT-C-80033-R(8808)(1)
Contract DI-14-34-0001-8808

The objective of this program is to develop solvent-impregnated microporous beads for the extraction of metal ions from industrial waste waters to yield reusable water. Several metal finishing waste streams were identified and investigated in preliminary studies. Various liquid ion-exchange agents were screened for each waste stream in order to find a satisfactory agent for use in the beads. Chromium, nickel, and acid-zinc plating rinse waters were selected as the most promising applications. The performance of the beads was substantially improved during the course of the contract. Improvements included reduction of bead size, increased bead production rate, and development of beads from different polymers. Several bead column optimization studies were performed, which were designed to improve metal capacity or kinetics. It was found that the chemical nature of the diluent significantly influenced extraction kinetics. The concentration of active agent in the agent-diluent mixture was also significant. Although the beads are in an early stage of development, they compare favorably with a cation-exchange resin in the treatment of a synthetic nickel plating solution. Beads developed for chromium removal exhibit rapid exchange kinetics, but a low total capacity.

PB80-813009 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Transportation for the Elderly or Physically Handicapped. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78,
Mary E. Young. Jul 80, 229p

Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities. (This updated bibliography contains 221 citations, none of which are new entries to the previous edition.)

PB80-813017 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Transportation for the Elderly or Physically Handicapped. 1979-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Jul 80,
Mary E. Young. Jul 80, 114p
Supersedes NTIS/PS-79/0840, and NTIS/PS-78/0828.

Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities. (This updated bibliography contains 106 citations, 59 of which are new entries to the previous edition.)

PB80-813025 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Sludge Disposal. 1975-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-Jun 80,
Audrey S. Hundemann. Jul 80, 302p
Supersedes NTIS/PS-79/0657 and NTIS/PS-78/0576. See also 1964-1974, NTIS/PS-77/0409.

Citations of Federally-funded research on sludge disinfection, irradiation, digestion, dewatering, decontamination for land disposal, recycling, incineration, and ocean disposal are presented. The effect of sewage sludge disposal on water pollution, ecosystems, and the environment is also covered. Studies on regulations, legislation, costs, and planning are included. (This updated bibliography contains 294 citations, 38 of which are new entries to the previous edition.)

PB80-813033 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Sludge Disposal. February, 1976-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for Feb 76-Jun 80,
Audrey S. Hundemann. Jul 80, 304p
Supersedes NTIS/PS-79/0658 and NTIS/PS-78/0577.

Citations of worldwide studies on sludge recycling, land application, incineration, biological degradation, and ocean dumping are presented. Sludge dewatering, drying, freezing, detoxification, piping, and fermentation are among topics included. Chemical analysis, water pollution impacts, soil fertilization, and crop monitoring are also covered. (This updated bibliography contains 298 citations, 32 of which are new entries to the previous edition.)

PB80-813108 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Offshore Structures. 1964-June 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Guy E. Habercom, Jr. Jul 80, 363p
Supersedes NTIS/PS-79/0792 and NTIS/PS-78/0750.

Offshore structures are investigated relative to their feasibility, design, construction, marine environments, and environmental impact. Nuclear power plants, floating cities, and airports are among the facilities included in the feasibility studies. (This updated bibliography contains 355 cita-

tions, 59 of which are new entries to the previous edition.)

PB80-813116 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remote Sensing Applied to Urban and Regional Planning. 1964-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jul 80,
Audrey S. Hundemann. Aug 80, 74p
Updates NTIS/PS-76/0500. Supersedes NTIS/PS-79/0843 and NTIS/PS-78/0790.

Urban and regional planning using aerial photography and satellite remote sensing methods is discussed. Abstracts cover the use of remote sensing in land use mapping, traffic surveys and urban transportation planning, and taking inventories of natural resources for urban planning. Abstracts dealing with land use and residential quality associated with and acting as an influence on health and physical well-being are included. (This updated bibliography contains 69 citations, 4 of which are new entries to the previous edition.)

PB80-813140 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA
Remote Sensing Applied to Environmental Pollution Detection and Management. 1964-July, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jul 80,
Audrey S. Hundemann. Aug 80, 192p
Updates NTIS/PS-76/0500. Supersedes NTIS/PS-79/0842 and NTIS/PS-78/0789.

Application of remote sensing methods to air, water, and noise pollution problems is discussed. Topic areas cover characteristics of dispersion and diffusion by which pollutants are transported, eutrophication of lakes, thermal discharges from electric power plants, outfalls from industrial plants, atmospheric aerosols under various meteorological conditions, monitoring of oil spills, and application of remote sensing to estuarian problems. (This updated bibliography contains 187 citations, 20 of which are new entries to the previous edition.)

SAND-79-1914 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
AUTOREZ: A Two-Dimensional, Lagrangian, Automatic Rezoning Wavecode (Preliminary Version).
P. Yarrington, and R. K. Byers. Mar 80, 41p
Contract EY-76-C-04-0789

AUTOREZ is a two-dimensional, Lagrangian, automatic-rezoning code based on the finite difference wavecode TOODY, and its associated rezoning code TOOREZ. Using an overlay structure, AUTOREZ employs TOODY and TOOREZ in nearly standard forms, with a third sub-program included to link the two. Many automatic rezoning options are available to the user, including mesh distortion measures which may be used to determine when rezoning is needed. Control card and input deck structures for AUTOREZ are described and three examples of AUTOREZ calculations are presented. (ERA citation 05:022778)

SAND-80-0249 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Review of Updated Sandia Wavecodes for Penetration Work.
F. R. Norwood. Feb 80, 31p
Contract EY-76-C-04-0789

For the special needs of the Sandia penetrator program, the codes TAUTQ, NORML, and OBLIK were written as modifications of the wavecodes WONDY and TOODY. This report presents a brief outline of the new codes, together with a set of instructions for running them. 1 figure. (ERA citation 05:022824)

UCRL-15094 PC **A09**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Environmental Overview of Geopressured-Geothermal Development: Texas Gulf Coast.
T. C. Gustavson, and C. W. Kreitler. 1979, 192p
Contract W-7405-ENG-48

In the summary of the recommended environmental program are: site specific studies, general studies, cost estimates for the program, socioeconomic and demographic research, potential environmental concerns, environmental research, effects of geopressure exploitation, and research plans. The socioeconomic and cultural considerations are impacts on communities. Waste disposal, geologic framework, ground subsidence, and monitoring techniques are discussed. (ERA citation 05:023995)

UCRL-15224 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Dynamics and Modeling of Heavier-Than-Air, Cold Gas Releases.
O. Zeman. 17 Apr 80, 55p
Contract W-7405-ENG-48

In this paper the phenomenon of gravity currents is examined with specific attention to heavier-than-air, cold gas releases such as during LNG spills. A one-layer model is developed which is capable of dealing with the inherently three-dimensional nature of such releases and which includes realistic initial conditions simulated by prescribing the gas boil-off velocity W/sub b/, within the spill area with scale L/sub o/. Dynamic similarity of the gravity currents is examined and similarity parameters (to interpret small experimental releases) are proposed. It is shown that a characteristic gravity spreading velocity varies as W/sub b//sup 1/3/L/sub o//sup 1/3/ with the depth scale of the layer proportional to (W/sub b/L/sub o/)/sup 2/3/. These scaling laws agree with the results from numerical experiments. (ERA citation 05:023612)

UCRL-52876 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Data and Calculations of Dispersion on 5 M exp 3 LNG Spill Tests.
R. P. Koopman, B. R. Bowman, and D. L. Ermak.
1 Oct 79, 35p
Contract W-7405-ENG-48

A series of liquefied natural gas (LNG) spill and dispersion experiments was carried out at the Naval Weapons Center at China Lake. These spills were nominally 5 m exp 3 of liquid spilled on a water pond under various wind conditions (3 to 10 m/s). The objective of the experiments was to evaluate sensors for field use in the detection of downwind hydrocarbon concentrations. The concentration data are shown as a function of time at various stations downwind from the spill point. These data are compared with calculations made by ATMAS, a computer model that uses wind field measurements as input then solves the advection diffusion equation for the downwind concentration as a function of time. The comparisons of data with ATMAS are quite good. It is concluded that ATMAS is a useful model; however, a more detailed description of the wind field (more measurements), a better model of the source (liquid pool spread and boil off of vapor), and the inclusion of variable density and temperature effects are required for better comparison with the data. The objective of the experiments, to evaluate sensors, was accomplished and has led to a selection of instruments to be placed in the field for larger (40 m exp 3 and more) spill and dispersion experiments to be conducted in the future. (ERA citation 05:021794)

13C. Construction Equipment Materials, and Supplies

PB80-192883 PC **A09**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Investigation of Construction Failure of Reinforced Concrete Cooling Tower at Willow Island, West Virginia.
Final rept.,
H. S. Lew, S. G. Fattal, J. R. Shaver, T. A. Reinhold, and B. J. Hunt. Nov 79, 195p NBSIR-78-1578
Sponsored in part by Occupational Safety and Health Administration, Washington, DC.

The collapse of the natural-draft hyperbolic concrete cooling tower unit no. 2 at the Pleasants Power Station at Willow Island, West Virginia has been investigated. This investigation included onsite inspections, laboratory tests of construction assembly components and concrete specimens, and analytical studies. Based on the results of these field, laboratory and analytical investigations, it was concluded that the most probable cause of the collapse was due to the imposition of construction loads on the shell before the concrete of lift 28 had gained adequate strength to support these loads. The analysis of the shell indicates that the collapse initiated at the part of the shell in lift 28 where cathead no. 4 was located. It further showed that calculated stress resultants at several points in that part equaled or exceeded the strength of the shell in compression, bending and shear. The failure of these points in that part of the shell would have propagated to cause the collapse of the entire lift 28.

PB80-198815 PC **A09**/MF **A01**
Illinois Univ. at Chicago Circle. Dept. of Materials Engineering.
Fracture Behavior of Fiber Reinforced Concrete Using the Double Cantilever Beam Technique,
Kitisak Visalvanich, and Antoine E. Naaman. May 80, 190p
Grant NSF-ENG77-23534

The fracture behaviors of concrete and fiber reinforced concrete is studied using contoured double cantilever beam specimens accommodating cracks up to 24 inches in length. Several reinforcing parameters are explored and include fiber length, aspect ratio, volume fraction of fibers, initial notch depth and matrix composition. Experimental results are used to evaluate the fracture properties of fiber reinforced concrete by linear-elastic or elastic-plastic fracture analysis techniques. They include the stress intensity factor K, the crack opening displacement COD, the fracture energy (equivalent strain energy or J-integral) and R-curve analysis. It is observed that different fracture energies can be derived for the same specimen depending on the technique used. Some of the more significant findings are (1) the stress intensity factor of plain mortar increases with crack extension and seems to stabilize at a crack extension of about 8 inches, no crack stabilization is observed for fiber reinforced mortar; (2) an initial crack opening angle (COA) is identified for plain mortar, it defines an angle at which the crack starts propagating regardless of its length; (3) large pseudo-plastic zones develop at the crack front of fiber reinforced specimens and depend on the reinforcing parameters.

RHO-C-21 PC **A03**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Expansion of Hanford Concrete.
M. Gillen. Oct 78, 32p
Contract EY-77-C-06-1030

This report presents results of measurements of thermal expansion of concrete cores from Hanford, Washington facilities, and concrete cast at the Construction Technology Laboratories of Portland Cement Association (CTL/PCA). Thermal expansion was measured from room temperature to 1600 exp 0 F on 0.5 x 3.0-in. specimens heated at a rate of 10 exp 0 F/min. Specimens were cored from concrete cylinders cast at CTL/PCA in 1975 and 1977, and from cylindrical cores taken from the Purex Building and Waste Tank Farms at the Hanford, Washington complex. A total of 14 specimens were tested: eight tests on CTL/PCA cast concrete, two tests on material from the Purex Building, and four tests on Waste Tank Farms concrete. All tests were conducted using a commercially built dilatometer of high strain resolution. (ERA citation 05:022731)

13D. Containers and Packaging

AD-A085 837/3 PC **A02**/MF **A01**
Air Force Packaging Evaluation Agency Wright-Patterson AFB OH
Evaluation of the F100-PW-100/F100-PW-200 Core Engine Module Container,
James T. Steiger. Apr 80, 19p Rept no. PTPD-80-10

This test was performed to determine if the new fiberglass-reinforced plastic (FRP) container can

qualify as a shipping and storage container for the F100-PW-100/F100-PW-200 Core Engine Module. One prototype FRP container was tested by the Air Force Packaging Evaluation Agency.

PB80-201122 PC **A07**/MF **A01**
National Bureau of Standards, Washington, DC.
Critical Materials and Fabrication Issues for Pressure Vessels, Piping, Pumps, and Valves.
Final rept.,
Jeffrey T. Fong, Ronald C. Dobbyn, and Leonard Mordfin. Jun 80, 127p NBS-SP-588
Library of Congress catalog card no. 80-600094.

Through an intensive two-year series of debates, meetings, presentations, and reviews, a total of twelve issues on the materials and fabrication aspects of technical problems in the pressure vessels and piping industry were identified. The twelve issues are: (1) The role of engineering judgment and the computer in the management of material property data; (2) Curve-fitting vs. modeling for formulating design rules; (3) New material property data: Terminal vs. incremental tests; (4) Variability of data: Standards for applications; (5) On-line monitoring of critical components to improve reliability; (6) Upgrading welders' skill and educational level: How and why; (7) Reliability of nondestructive evaluation; (8) Characterization of the subjective component of inservice data; (9) Should there be a methodology for failure analysis; (10) Accelerated development of a more rational basis for nonlinear fracture mechanis; (11) Safety factors in Fatigue Design: Arbitrary or Rational; (12) The ASME Code and product liability: Should compliance create a rebuttable presumption of proper design. This report contains extended abstracts of the twelve issue papers and summaries of reviewers' comments.

13E. Couplings, Fittings, Fasteners, and Joints

N80-26405/4 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Effect of Degree of Abrasion of Carbon Fiber Composite Surfaces on Strengths of Adhesive Bonded Joints.
M. H. Stone. Dec 79, 10p RAE-TM-MAT-327, BR71986

Strengths of double lap joints between carbon fiber composite and aluminum alloy varied over a three fold range, and low strengths were correlated with a high proportion of failure in adhesion to the composite. Low strengths were traced to incomplete abrasion by grit blasting of the composite surface before bonding, although the effect appeared to depend on the adhesive used. Low strengths of lightly abraded joints were probably due to PTFE residues from release cloth. Careful control of blasting conditions allied to thorough inspection is necessary to ensure complete abrasion without exposure of carbon fiber.

N80-26664/6 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.
Investigations into the Mechanical Behavior of Composite Bolted Joints.
J. C. Perry, and M. W. Hyer. Jun 79, 63p NASA-CR-163295, VPI-E-79-22
Grant NSG-1167

Testing procedures and data reduction and interpretation techniques were established for a program to study the mechanical behavior of bolted joints at room temperature, -157 C (-250 F), and 315 C (600 F). The load transfer characteristics, from one bolt to another, in double-bolt joints were investigated by examining data generated in previous investigations. From the results, it appears the increase in load-carrying capacity by adding a second bolt in tandem can be predicted.

N80-26698/4 PC **A05**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.
Strain Measurements in Composite Bolted-Joint Specimens.
M. W. Hyer, M. C. Lightfoot, and J. C. Perry. May 79, 87p NASA-CR-163296, VPI-E-79-17
Grant NSG-1167

Strain data from a series of bolted joint tests is presented. Double lap, double hole, double lap, single hole, and open hole tensile specimens were tested and the strain gage locations, load strain responses, and load axial displacement responses are presented. The open hole specimens were gaged to determine strain concentration factors. The double lap, double hole specimens were gaged to determine the uniformity of the strain in the joint and the amount of load transferred past the first bolt. The measurements indicated roughly half the load passed the first bolt to be reacted by the second bolt.

N80-26700/8 PC **A03**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Viscoelastic Analysis of Adhesively Bonded Joints.
F. Delale, and F. Erdogan. Mar 80, 28p NASA-CR-159294
Contracts NGR-39-007-011, NSF ENG-78-09737

An adhesively bonded lap joint is analyzed by assuming that the adherends are elastic and the adhesive is linearly viscoelastic. After formulating the general problem a specific example for two identical adherends bonded through a three parameter viscoelastic solid adhesive is considered. The standard Laplace transform technique is used to solve the problem. The stress distribution in the adhesive layer is calculated for three different external loads, namely, membrane loading, bending, and transverse shear loading. The results indicate that the peak value of the normal stress in the adhesive is not only consistently higher than the corresponding shear stress but also decays slower.

PAT-APPL-6-152 456 PC **A02**/MF **A01**
Department of the Navy Washington DC
Seafloor Attachment Bolts.
Patent Application,
Wayne R. Tausig. Filed 22 May 80, 14p AD-D007 311/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a fastener assembly for securing structures to the seafloor including a shaft of circular cross-section having a frusto-conically shaped head on a leading end for insertion into a prepared borehole and a mandril section at the other end having annular grooves around it perimeter. An expansible sleeve is disposed around the shaft in interference fit with the borehole so that when the shaft is pulled upward, the head will force the expansible member to expand against the sides of the borehole. The shaft is disposed with the grooved section extending through an aperture in a workpiece and a malleable collar is positioned around the shaft resting on the workpiece. A conventional blind riveting installation tool may be used to pull the shaft upward to engage the expansible sleeve in the borehole and to swage the malleable collar to the grooved shaft against the workpiece. (Author)

PB80-808587 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Anchor Bolts. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 118p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts discuss anchor bolts, roof bolts or rock bolts as used mostly in mine and other underground operations. Bolt design and construction, hole drilling techniques, methods of bolt mounting, and measurements of installed bolt condition are described. Some citations treat non-mining rock bolt applications. (Contains 103 citations)

13F. Ground Transportation Equipment

ATR-79(7759)-(V.2) PC **A15**/MF **A01**
Escher Technology Associates, St. Johns, MI.
Study of Hydrogen-Powered Versus Battery-Powered Automobiles.
J. J. Donnelly, Jr., W. C. Greayer, R. J. Nichols, and W. J. D. Escher. May 79, 341p
Contract EM-78-C-03-2184

A study conducted to compare the technological status and the resultant potential vehicle characteristics for hydrogen- and battery-powered automobiles that could be produced from 1985 to 2000 is documented in 3 volumes. The primary objectives of the study were: the assessments of applicable energy storage and propulsion technology for the two basic vehicle types (applied to four-passenger cars); a rigorous comparison of vehicle weight, size, and usefulness versus design range; and an investigation of the relative efficiencies of expending energy from various primary sources to power the subject vehicles. Another important objective, unique to hydrogen-powered vehicles, was the assessment of the technology, logistics, and cost implications of a hydrogen production and delivery capability. This volume, Volume II, provides an introduction to the study and two major sections applicable to hydrogen-powered vehicles - the study of hydrogen production and delivery alternatives before the year 2000 and the assessment of automotive technology for hydrogen storage and use in internal combustion engines. (ERA citation 05:024341)

CONS-4209-T1(V.10) PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Hybrid Vehicle Potential Assessment. Volume 10. Electric and Hybrid Vehicle Cost Handbook.
R. C. Heft, and S. C. Heller. 30 Sep 79, 77p
Contract EM-78-I-01-4209

The purpose of this interim cost handbood is to provide a consistent single-point source of data and procedures for estimating the costs of electric and hybrid vehicles. These costs include manufacturing, acquisition (purchase price), operating, and life cycle. Each suggested Cost Estimating Relation (CER) presented herein is a result of the compilation of currently existing cost estimates and cost relationships. No independent cost analysis was performed for this handbook, nor was any analysis performed to rework existing cost data for consistency in all primary assumptions. The cost data is presented in terms of major component and subassembly costs so that any vehicle (electric, hybrid, or conventional) can be costed. The cost estimating relations presented in this handbook are subjective averages of the several independent estimates for each component. (ERA citation 05:024342)

DOE/NASA/1040-80/13 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Supporting Research and Technology for Automotive Stirling Engine Development.
W. A. Tomazic. 1980, 21p NASA-TM-81495, CONF-800419-2
Contract EC-77-A-31-1040
Symposium on automotive propulsion systems, Dearborn, MI, USA, 14 Apr 1980.

The technology advancement topics described are a part of the supporting research and technology (SRT) work being conducted to support the major Stirling engine development program. This support focuses on developing alternatives or backups to the engine development work in critical areas. These areas are materials, seals, controls, combustors, and system analysis. A brief status report on each of these key areas will be presented. Specific objectives and planned milestone schedules for future activities as now envisioned are described. These planned SRT activities will be related to the timeline of the engine development program that they must support. (ERA citation 05:022621)

N80-27222/2 PC **A08**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
The Near-Term Hybrid Vehicle Program, Phase 1.
Final Report.
10 Sep 79, 153p NASA-CR-163034, JPL-9950-355
Contract JPL-955189
Sponsored by NASA Prepared for JPL.

Performance specifications were determined for a hybrid vehicle designed to achieve the greatest reduction in fuel consumption. Based on the results of systems level studies, a baseline vehicle was

constructed with the following basic paramaters: a heat engine power peak of 53 kW (VW gasoline engine); a traction motor power peak of 30 kW (Siemens 1GV1, separately excited); a heat engine fraction of 0.64; a vehicle curb weight of 2080 kg; a lead acid battery (35 kg weight); and a battery weight fraction of 0.17. The heat engine and the traction motor are coupled together with their combined output driving a 3 speed automatic transmission with lockup torque converter. The heat engine is equipped withe a clutch which allows it to be decoupled from the system.

N80-27223/0 PC **A09**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Mission Analysis and Performance Specification Studies Report, Appendix A.
25 Jan 79, 177p NASA-CR-163035, JPL-9950-355
Contract JPL-955189
Sponsored by NASA Prepared for JPL Prepared in Cooperation with Gen. Res. Corp., Santa Barbara, Calif.

The Near Term Hybrid Passenger Vehicle Development Program tasks included defining missions, developing distributions of daily travel and composite driving cycles for these missions, providing information necessary to estimate the potential replacement of the existing fleet by hybrids, and estimating acceleration/gradeability performance requirements for safe operation. The data was then utilized to develop mission specifications, define reference vehicles, develop hybrid vehicle performance specifications, and make fuel consumption estimates for the vehicles. The major assumptions which underlie the approach taken to the mission analysis and development of performance specifications are the following: the daily operating range of a hybrid vehicle should not be limited by the stored energy capacity and the performance of such a vehicle should not be strongly dependent on the battery state of charge.

N80-27224/8 PC **A12**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Design Tradeoff Studies and Sensitivity Analysis, Appendix B.
25 May 79, 251p NASA-CR-163036, JPL-9950-355-APP-B
Contract JPL-955189
Sponsored by NASA Prepared for JPL.

Further work was performed on the Near Term Hybrid Passenger Vehicle Development Program. Fuel economy on the order of 2 to 3 times that of a conventional vehicle, with a comparable life cycle cost, is possible. The two most significant factors in keeping the life cycle cost down are the retail price increment and the ratio of battery replacement cost to battery life. Both factors can be reduced by reducing the power rating of the electric drive portion of the system relative to the system power requirements. The type of battery most suitable for the hybrid, from the point of view of minimizing life cycle cost, is nickel-iron. The hybrid is much less sensitive than a conventional vehicle is, in terms of the reduction in total fuel consumption and resultant decreases in operating expense, to reductions in vehicle weight, tire rolling resistance, etc., and to propulsion system and drivetrain improvements designed to improve the brake specific fuel consumption of the engine under low road load conditions. It is concluded that modifications to package the propulsion system and battery pack can be easily accommodated within the confines of a modified carryover body such as the Ford Ltd.

N80-27225/5 PC **A09**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Design Tradeoff Studies and Sensitivity Analysis, Appendices B1 - B4.
25 May 79, 190p NASA-CR-163037, JPL-9950-355-APP-B1-B4
Contract JPL-955189
Sponsored by NASA Prepared for JPL.

Documentation is presented for a program which separately computes fuel and energy consumption for the two modes of operation of a hybrid electric vehicle. The distribution of daily travel is specified as input data as well as the weights which the component driving cycles are given in each of the composite cycles. The possibility of weight reduction through the substitution of various materials is considered as well as the market potential for hybrid vehicles. Data relating to battery compartment weight distribution and vehicle handling analysis is tabulated.

N80-27226/3 PC **A11**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Preliminary Design Data Package, Appendix C.
25 Jul 79, 239p NASA-CR-163038, JPL-9950-355-APP-C
Contract JPL-955189
Sponsored by NASA Prepared for JPL.

The data and documentation required to define the preliminary design of a near term hybrid vehicle and to quantify its operational characteristics are presented together with the assumptions and rationale behind the design decisions. Aspects discussed include development requirements for the propulsion system, the chassis system, the body, and the vehicle systems. Particular emphasis is given to the controls, the heat engine, and the batteries.

N80-27227/1 PC **A10**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Preliminary Design Data Package, Appendices C1 and C2.
25 Jul 80, 202p NASA-CR-163039, JPL-9950-355-APP-C1
Contract JPL-955189
Sponsored by NASA Prepared for JPL.

The HYBRID2 program which computes the fuel and energy consumption of a hybrid vehicle with a bi-modal control strategy over specified component driving cycles is described. Fuel and energy consumption are computed separately for the two modes of operation. The program also computes yearly average fuel and energy consumption using a composite driving cycle which varies as a function of daily travel. The modelling techniques are described, and subroutines and their functions are given. The composition of modern automobiles is discussed along with the energy required to manufacture an American automobile. The energy required to scrap and recycle automobiles is also discussed.

N80-27231/3 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Hybrid Vehicle Potential Assessment. Volume 7: Hybrid Vehicle Review.
K. O. Leschly. 30 Sep 79, 44p NASA-CR-163298, CONS-4209-T1-V-7
Contract EM-78-I-01-4209
Sponosred by NASA.

Review of hybrid vehicles built during the past ten years or planned to be built in the near future is presented. An attempt is made to classify and analyze these vehicles to get an overall picture of their key characteristics. The review includes onroad hybrid passenger cars, trucks, vans, and buses.

PB80-196082 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
The Effect of Acceleration Rate on Automatic Transmission Shift-Speeds for Two 1979 Novas.
Technical rept.,
Randy Jones. Jan 80, 15p EPA-AA-SDSB-80-3

Variations in acceleration rates will result in variations in vehicle fuel economy. If typical vehicle acceleration rates are distributed in the same manner as the accelerations are distributed on the EPA test cycles, or if the vehicle operational characteristics do not significantly change with acceleration rate, then results from the EPA cycles should be representative of average vehicle use. However, if vehicle operational characteristics change with changing acceleration rates, and if vehicle accelerations in consumer use are not distributed in the same manner as the accelerations of the EPA test cycle, then significant differences between EPA estimated fuel economy and actual vehicle fuel consumption may result. One vehicle characteristic which often changes with acceleration rate is the transmission shift speed for vehicles with automatic transmissions. To determine the effects of acceleration rates on transmission shift speeds, EPA recently conducted a short test sequence on two vehicles with automatic transmissions. These tests determined the relation between vehicle acceleration rate and transmission shift speed for acceleration rates from 1 to 6 mph/sec.

PB80-196207 PC **A14**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume I: FMVSS 105 (Hydraulic Brake Systems on Passenger Cars).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 303p DOT-HS-805 315
Contract DOT-HS-8-02015
See also Volume 2, PB80-196215.
Also available in set of 6 reports PC E15, PB80-196199.

A program was conducted to develop the consumer cost and weight variance resulting in the implementation of FMVSS 105 in the 1968 and 1976 passenger vehicles. An Integrated Cost Sampling Plan was developed that provided for the selection of specimen vehicles from the four classes of vehicles. Total brake systems were purchased for 1966 vehicles and were considered the baseline systems. Cost and weight differential between 1966 and 1968 models was the result of the first implementation. The cost and weight difference between the 1968 and 1976 models was the result of the second implementation. Automotive industry type teardown and manufacturing cost estimating techniques were applied and developed cost and weight data for the implementation analysis. The consumer cost per vehicle for the 1968 implementation was $11.80 and a weight increase of 15.83 pounds. The 1976 implementation consumer cost was $10.57 with an increase of 25.94 pounds.

PB80-196215 PC **A06**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume II: FMVSS 108 (Side Marker Lamps).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 118p DOT-HS-805 316
Contract DOT-HS-8-02015
See also Volume 1, PB80-196207 and Volume 3, PB80-196223.
Also available in set of 6 reports PC E15, PB80-196199.

A program was conducted to determine the implementation consumer cost and weight variance per vehicle caused by the implementation of FMVSS 108 in January 1970. This study is direct to the implementation of the lamps to the system. Baseline systems were established and a cost and weight variance was considered the implementation cost and weight. A volume weighted average was prepared for the four car classes in the years of implementation. The weighted average factors were applied to the 1979 car volumes. The implementation resulted in a consumer cost increase of $2.89 and a weight increase of .38 pounds. The Halogen Lamp was studied and the consumer cost was estimated to be $3.21 each. Weight of the lamp was 1.1 pounds.

PB80-196223 PC **A03**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume III: FMVSS 122 (Motorcycle Brake Systems).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 35p DOT-HS-805 317
Contract DOT-HS-8-02015
See also Volume 2, PB80-196215 and Volume 4, PB80-196231.
Also available in set of 6 reports PC E15, PB80-196199.

A program was conducted to determine if implementation consumer cost and weight variance resulted from the establishment of the standard in January 1974. Five models of motorcycle brake systems were examined. The same components existed for both the implementation year and the

year prior to implementation. A further check indicated that the standard was being met for several years prior to the implementation date. The Honda Model 350 changed to a Model 360. The change in components were believed by the Contractor to be due to design requirements rather than the standard. It was concluded that the cost of implementation of the standard in January 1974 was zero. A summary of cost data was presented for each model studied.

PB80-196231 PC **A05**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume IV: FMVSS 202 (Head Restraints) and 207 (Seating Systems).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 84p DOT-HS-805 318
Contract DOT-HS-8-02015
See also Volume 3, PB80-196223 and Volume 5, PB80-196249.
Also available in set of 6 reports PC E15, PB80-196199.

A program was conducted to determine the consumer cost and weight variance due to the implementation of FMVSS 202 and FMVSS 207. Several 1969 vehicle seats were purchased for the purpose of obtaining adjustable headrests, integral headrests, and seat locks. The standard tear-down cost estimating procedure was used to develop variable cost. The Macro-Analysis Factor was used to develop wholesale and consumer cost for each specimen. A volume weighted average of weight and consumer cost was developed for the integral and adjustable headrests. These weighted averages were applied to the 1979 industry vehicle mix. The implementation of FMVSS 202 resulted in a consumer cost of $17.68 and an increase in weight of 9.15 per vehicle. Several lock specimens were examined, cost estimate made, data extended by using the Macro-Analysis Method and average cost of implementation FMVSS 207 was a consumer cost of $6.81 and an increase in weight of 2.69 pounds. This standard only applies to vehicles with hinge front seats. No additional reinforcement appeared under the area of the seat attachments.

PB80-196249 PC **A04**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume V: FMVSS 213 (Child Seating Systems).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 74p DOT-HS-805 319
Contract DOT-HS-8-02015
See also Volume 4, PB80-196231 and Volume 6, PB80-196256.
Also available in set of 6 reports PC E15, PB80-196199.

A program was conducted to determine the cost and weight of several popular infant and child seats. The seats were purchased, torndown to basic components, cost and manufacturing processing methods applied to derive variable cost, specimens photographed and costs extended by use of the Macro-Analysis Method to develop Wholesale and Consumer Cost. Consumer cost varied for infant seats from $20.00 to $26.50 and the weight varied from 1.5 to 8.8 pounds. Consumer cost of the child seat varied from $40.97 to $49.95 and the weight varied from 8.8 pounds to 10.8 pounds.

PB80-196256 PC **A04**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Standards. Volume VI: FMVSS 220 (School Bus, Rollover Protection), 221 (School Bus, Joint Strength), 222 (School Bus, Seating and Crash Protection).
Final rept. Oct 78-Nov 79,
M. R. Harvey, J. A. Lesczhik, and R. F. McLean.
Nov 79, 59p DOT-HS-805 320
Contract DOT-HS-8-02015
See also Volume 5, PB80-196249.
Also available in set of 6 reports PC E15, PB80-196199.

Total consumer out-of-pocket costs have been estimated for three school bus Federal Motor Vehicle Safety Standards. These are the FMVSS 220 Rollover Protection, FMVSS 221 Body Joint Strength, and FMVSS 222 Seating and Crash Protection. From a list of eight major school bus body builders, three were selected for plant visits. The manufacturers representatives were questioned as to the extent of design, material, production, and personnel changes required to meet each standard. A plant inspection tour was made and the types of buses produced and the rates of production were established. The general findings as to the changes in design and production required to meet the new standards were: FMVSS 220--No change; FMVSS 221--Adhesive added to body joints; and FMVSS 222--Seats strengthened, padding added, front barriers added, seat belts added to under 10,000 pound vehicles. The typical variable profit of the manufacturer was established as was an average dealer's discount. The average costs of complying with the standards were established as: FMVSS 220--No cost; FMVSS 221--$242.37; and FMVSS 222--$784.72 (over 10,000 pounds GVWR)--$249.92 (under 10,000 pounds GVWR).

PB80-196546 PC **A07**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
Ramp Design Parameters for Low-Floor Transit Buses.
Final rept.
Apr 80, 134p BP-79-002, UMTA-MD-06-0024-80-1
Contract DOT-UT-70032
See also report dated May 77, PB-269 290 and PB-300 497.

Reducing transit coach travel barriers to transportation handicapped individuals has been a key design goal of the Transbus development program. The report recommends accessibility design parameters for transportation handicapped individuals on ramp-equipped Transbus coaches. The research approach was to use physically handicapped volunteers to test a full-scale mock-up of a Transbus coach. The participants had various physical disabilities, although emphasis was placed on using wheelchair-bound individuals, as their configuration was believed to present a more difficult accessibility problem. Evaluation of the various parameters was accomplished by recording times to conduct the maneuvers, recording participants' and bystanders' reactions, and noting any problems encountered during the maneuvers. Dimensional requirements for coach interior and ramp maneuvering were evaluated as well as nonquantifiable requirements such as ramp surface materials, desirability or need for hand-rails, and safety conditions.

PB80-196611 PC **A03**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Development of Car/Trailer Handling and Braking Standards. Volume I: Executive Summary.
Final rept. Sep 77-Nov 79,
Richard H. Klein, and Henry T. Szostak. Nov 79, 39p STI-TR-1114-1-VOL-1, DOT-HS-805 326
Contract DOT-HS-7-01720
See also Volume 2, PB80-196629.
Also available in set of 4 reports PC E12, PB80-196603.

This report summarizes the development of handling and braking performance requirements for passenger cars towing trailers. These requirements are based on the results of over 2000 combination-vehicle tests with eight trailers and three rear wheel drive tow cars (in 95 different configurations), over 500 tests with three trailers and two front wheel drive tow cars (in 38 different configurations), plus the results of previous trailer towing research. The proposed standards include recommendations for straight line braking performance, trailer swing stability, tow car steady turn stability, and combined brake in turn stability and performance. For straight line braking, the recommended performance criterion is 0.4 g deceleration of the combination-vehicle. A tow car weight based on trailer brake capability requirement is presented to insure that the combination-vehicle will meet this deceleration requirement. For trailer swing stability the safety-related performance measure is damping ratio, or the equivalent cycles to one-half amplitude. A minimum damping ratio of 0.15 (or 3/4 cycles to one-half amplitude) has been recommended.

PB80-196629 PC **A07**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Development of Car/Trailer Handling and Braking Standards. Volume II: Technical Report for Phase I - Rear Wheel Drive Tow Cars.
Final rept. Sep 77-Nov 79,
Richard H. Klein, and Henry T. Szostak. Nov 79, 150p STI-TR-1114-1-VOL-2, DOT-HS-805 327
Contract DOT-HS-7-01720
See also Volume 1, PB80-196611 and Volume 3, PB80-196637.
Also available in set of 4 reports PC E12, PB80-196603.

This report identifies suitable handling and braking performance requirements for rear-wheel drive passenger cars towing trailers. This includes straight line braking, trailer swing stability, tow car steady turn stability, and combined brake-in-turn stability. Over 2000 combination-vehicle tests with eight trailers and three tow cars (in over 250 different configurations), plus the results of previous trailer towing research were then used to validate and/or revise the criteria and procedures. For straight line braking performance a combination-vehicle deceleration criterion of 0.4 g is recommended. A tow car weight requirement based on trailer brake capability is presented to insure the combination vehicle will meet the deceleration requirement. For trailer swing stability the safety-related performance measure is damping ratio, or the equivalent cycles to one-half amplitude. A minimum damping ratio of 0.15 (or 3/4 cycles to 1/2 amplitude) is recommended. Test procedures and analysis curves are presented which can be used to determine damping ratios for each trailer. In this case a minimum hitch load criterion based on tow car weight is suggested to insure performance compliance. For tow car stability a tentative performance criterion of maintaining a positive tow car understeer gradient up to and including 0.3 g cornering is recommended.

PB80-196637 PC **A06**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Development of Car/Trailer Handling and Braking Standards. Volume III: Appendices for Phase I.
Final rept. Sep 77-Nov 79,
Henry T. Szostak. Feb 79, 125p STI-TR-1114-1-VOL-3, DOT-HS-805 328
Contract DOT-HS-701720
See also Volume 2, PB80-196629 and Volume 4, PB80-196645.
Also available in set of 4 reports PC E12, PB80-196603.

This document contains supportive information relevant to the main technical discussion and results presented in Volume II. This includes all relevant specifications and descriptions of the tow vehicles, trailers, instrumentation, equipment, and test procedures used in the test portion of the program. Also included are supporting data reduced from straight line braking tests, cornering tests, and trailer damping tests. Raw data are contained on 4 FM analog tape. A run log summary is presented to identify conditions of each test run recorded on tape.

PB80-196645 PC **A06**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Development of Car/Trailer Handling and Braking Standards. Volume IV: Technical Report for Phase II - Front Wheel Drive Tow Cars.
Final rept. Sep 77-Nov 79,
Richard H. Klein, and Henry T. Szostak. Nov 79, 109p STI-TR-1114-1-VOL-4, DOT-HS-805 329
Contract DOT-HS-7-01720
See also Volume 3, PB80-196637.
Also available in set of 4 reports PC E12, PB80-196603.

This report verifies the handling and braking performance requirements proposed in Vol. II for passenger cars towing trailers. This includes straight line braking, trailer swing stability, tow car steady turn stability, and combined brake-in-turn stability. Over 500 combinations vehicle tests with three

trailers and two front wheel drive tow cars (in 34 different configurations), plus the results of previous trailer towing research have been integrated into proposed performance criteria, and a compliance format based on tow car and trailer characteristics. For straight line braking performance a combination-vehicle (CV) deceleration criteria of 0.4g is recommended. A tow car weight requirement based on trailer brake capability is presented to insure the CV will meet this deceleration requirement. For unbraked trailers the tow car gross weight rating should never be less than 1.5 times the trailer weight. For trailer swing stability the safety-related performance measure is damping ratio, or the equivalent cycles to one-half amplitude. A minimum damping ratio of 0.15 (or 3/4 cycles to 1/2 amplitude) is recommended. Test procedures and analysis curves are presented which can be used to determine damping ratio for each trailer.

PB80-196868 PC **A13**/MF **A01**
Battelle Columbus Labs., OH.
Measurements of Wheel/Rail Loads on Class 5 Track.
Final rept. Jan-Dec 78,
Donald R. Ahlbeck, Milton R. Johnson, Harold D. Harrison, and James M. Tuten. Feb 80, 294p
FRA/ORD-80/19, DOT-TSC-FRA-80-6
Contract DOT-TSC-1051
Prepared in cooperation with IIT Research Inst., Chicago, IL.

Measurements have been made on two tangent test sections and a curved test section to characterize the wheel/rail load environment on Class 5 track. The tangent-track test sections included a 3-mile length of bolted-joint rail and a 3-mile length of continuous welded rail. Wayside measurements of loads under passing revenue traffic were obtained from randomly located strain gage patterns on the rail, while an instrumented 100-ton freight car was run over the test sections at a range of speeds to define the load spectrum from the vehicle. Joint impact loads were defined from the instrumented wheelset measurements, while special wayside measurements were included to define the influence of wheel flats. Additional measurements were obtained from the on-board instrumentation over a test section that included two 6-degree, 6-inch super elevation curves. This report presents the data obtained from these measurements and describes the wayside and vehicle-borne instrumentation, the experiment design and operation, and the data reduction and analysis approach employed. Statistical summaries of the load environments are presented.

PB80-196892 PC **A10**/MF **A01**
ENSCO, Inc., Alexandria, VA. Transportation and Instrumentation Sciences Div.
U. S. Transit Track Assessment and Research Needs.
Final rept. Apr 78-Jul 79,
E. G. Cunney, P. L. Boyd, and J. A. Woods. Dec 79, 211p DOT-TSC-UMTA-79-41, UMTA-MA-06-0100-79-16
Contract DOT-TSC-1502
Prepared in cooperation with London Transport International Ltd. (England).

The overall objective of the study is to help expand and systematize the current search for improvements in transit track. The study was initiated to identify new technology and research tasks that may help increase the performance, reliability, and safety of urban rapid transit systems, and to help ensure that track research provides maximum benefits to the transit industry. Track problems and practices were investigated at transit properties in the United States, and technology was studied in the transit industry and other industries in the United States and Europe. Throughout the study, information was sought on the best technological practices currently available and on improvements that may be obtained through systematic research. This report describes track conditions; current practice in track design, construction, maintenance, and inspection; potential opportunities for improvements; favorable technology that is available but not commonly used in transit track systems; and research and support tasks to fill identified needs. The report also describes the evaluation of research and support tasks for relative importance, the analysis of their costs and benefits, and a recommended implementation plan for a track research program.

PB80-197700 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
A Report on Light Rail Transit: Surface Operations.
Final rept.
Apr 80, 31p UMTA-DC-06-0216-80-1
Contract DOT-UT-80040

This report recognizes the fact that the high costs of segregated fixed-guideway transit have dampened LRT's popularity. As a result, the Transportation Research Board (TRB) and UMTA decided to conduct an examination of the obstacles to lower-cost surface configurations. Toward this end, a by-invitation-only seminar was convened in Washington, DC, on December 5-6, 1978. Its objective was to trace specific problems and to propose where effort toward their solution should be most effectively directed. These problems were expressed as a set of issues that served to focus thought and guide proceedings. This report contains three background papers as well as the summary of discussions on the impact of alignment options, traffic-engineering requirements, safety requirements, safety requirements for installation and operation requirements for passenger stop locations, intermodal interface, fare-collection options for surface operation, and future actions.

PB80-197726 PC **A10**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Technical Services Div.
Technical Reports of the National Highway Traffic Safety Administration; a Bibliography, 1979.
Subject bibliography rept. (Annual) 1979,
Lois Flynn. Apr 80, 215p SB-40, DOT-HS-805 313
See also report dated May 79, PB-298 933.

This bibliography cites those technical reports published by the National Highway Traffic Safety Administration (NHTSA) during 1979. It serves as a supplement to previously published bibliographies covering the years 1967 through 1978. Citations follow the format used in the monthly abstract journal Highway Safety Literature and are indexed by a key-word-out-of-context (KWOC) listing, author, corporate author, contract number, and report number.

PB80-197775 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of the Ethyl Turbulent Flow Manifold Lean Mixture Induction System as Applied to a BMW Two-Litre Automobile.
Technical rept.
May 75, 12p EPA-AA-TAEB-75-23

For many years, Ethyl Corporation engineers have conducted research into engine operation at lean air-fuel ratios. They were interested in lean-mixture combustion because of the inherently low emissions and good fuel economy that are possible with a properly controlled lean engine. Some of their recent research efforts have been to demonstrate the potential of lean-mixture control techniques to meet the future emissions standards of the European Economic Community. Part of the recent work at Ethyl has been with vehicles that use small high-performance engines, on which significant reductions in emissions have been achieved. The Emission Control Technology Division, consistent with its continuing interest in the evaluation of advanced automotive emission control technology, requested a vehicle for testing, and a BMW 2002, equipped with Ethyl's Turbulent Flow Manifold induction system, was made available.

PB80-197783 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Exhaust Emissions and Fuel Economy from a Volvo Three-Way Catalyst Prototype Vehicle.
Technical rept.
Mar 75, 12p EPA-AA-TAEB-75-18

In its continuing interest to keep abreast of technological developments in the area of emission controls, the Environmental Protection Agency requested Volvo of America Corporation to allow EPA to perform emissions testing on a prototype Volvo fitted with their three-way-catalyst system (TWC). Volvo agreed and sent a vehicle from Sweden which arrived in Ann Arbor on November 8, 1974. The catalyst had 4000 miles accumulated on it and had been tested for emissions prior to shipment; results indicated that emissions levels were below the 1977 Federal Emissions Standards of .41 grams per mile hydrocarbons (HC), 3.4 grams per mile carbon monoxide (CO), and 2.0 grams per mile oxides of nitrogen (NOx).

PB80-197924 PC **A14**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Accident Avoidance Capabilities of Mopeds. Volume II: Technical Report.
Final rept. Oct 77-Feb 80,
John W. Zellner, and David H. Weir. Feb 80, 312p STI-TR-1113-1-II, DOT-HS-805 331
Contract DOT-HS-7-01719
See also Volume 1, PB80-186651.

Moped response, performance, and accident avoidance capabilities are assessed. Moped design features are reviewed. Four instrumented vehicles were evaluated. Full scale tests included steady turn, lane change, free control stability, roadway disturbances, open and closed loop braking, acceleration/top speed, and hill climb. Two wheeler test procedures and measures are presented, along with subjective evaluations. Sensitivity to operating variables are quantified. Potential safety-related handling problems were identified. A typical moped was modified for increased speed performance, and upgraded brake and tire components.

PB80-198369 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Exhaust Emissions from a Diesel-Powered Volkswagen Rabbit.
Technical rept.
Oct 75, 16p EPA-AA-AEB-76-06

Volkswagenwerk A.G. has developed a small Diesel engine for installation in the VW Rabbit. This engine potentially offers low exhaust emissions and high fuel economy. A prototype Diesel-powered Rabbit was made available to the EPA for an evaluation of its emission and fuel economy performance.

PB80-198633 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
An Evaluation of Two Honda Automobiles Powered by 91 CID Stratified Charge CVCC Engines.
Technical rept.
1976, 14p EPA-AA-TAEB-76-03

The U.S. Environmental Protection Agency receives information about many systems which appear to offer potential for emission reduction or fuel economy improvement compared to conventional engines and vehicles. This evaluation of two Honda Compound Vortex Controlled Combustion (CVCC) vehicles is the third opportunity for the EPA's Emission Control Technology Division to report on the emission and fuel economy performance of vehicles incorporating the stratified charge engine that Honda Motor Company of Japan announced publicly in the Fall of 1972. In September of 1973 EPA requested the loan of a CVCC powered Civic for use in comparison tests between various stratified charge, Diesel, and conventional engined vehicles. In response to this request, two vehicles were provided by Honda for an indefinite period of time. This report covers the first series of in-house evaluations of the vehicles loaned by Honda for the comparison program. Further testing and comparisons with other vehicles will be drawn in future EPA reports.

PB80-199185 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Electronic Engine Controls - Availability, Durability, and Fuel Economy Effects on 1983 and Later Model Year Light-Duty Trucks.
Technical rept.,

Thomas Nugent, Zachary Diatchun, and Timothy Cox. Jun 80, 19p EPA-AA-SDSB-80-11

The application of microprocessor technology to optimize the functions of the internal combustion engine is underway. Passenger car model years 1980 and 1981 have seen the widespread introduction of electronic engine controls of varying degrees of complexity. These controls hold the promise of lowering engine emissions and raising engine fuel economy through the optimization of the combustion processes at all engine operational conditions. This paper examines the potential of this technology for use in the future light-duty truck fleet. The implications of this technology on fleet fuel economy, in conjunction with the more stringent emission standards in 1983, are examined along with projections as to the future availability and durability of these microprocessors and their associated engine sensors.

PB80-199383 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
The Effect of Load and Inertia on Particulate Emissions.
Technical rept.,
Eugene Danielson. Jan 80, 7p EPA-AA-SDSB-80-1

This report summarizes particulate emissions data from light-duty diesel trucks operating over a range of road loads and inertia weights. The results indicate that diesel particulate emissions are relatively insensitive to road load but are significantly influenced by changes in vehicle inertia weight. Information of this nature is useful in determining differences in particulate emissions that can be expected when the same engine is applied to vehicles of different sizes and weights.

PB80-199722 PC **A07**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume I. Project Summary.
Final rept.,
G. A. Haines, M. Fry, F. Mayer, and G. Peckham. Mar 80, 143p OTIS-TTD-VLACS-049, UMTA-IT-06-0156-79-1
Contract DOT-UT-70088
See also Volume 2, Part A, PB80-199730, and report dated Apr 78, PB-286 551.
Also available in set of 7 reports PC E99, PB80-199714.

This report is one volume of a six-volume final report of the Vehicle Lateral Control and Switching (VLACS) Project sponsored by the Urban Mass Transportation Administration of the Department of Transportation. Volume I, this report, summarizes the results and significant findings of the project. The project objectives are to investigate and improve the steering and switching capabilities of automated transit vehicles through analysis, simulation, and test of lateral control of switching systems and to develop guidelines for the development of these systems. Three types of steering systems are investigated: (1) wire-follower power-assisted steering; (2) wall-follower power-assisted steering; and (3) passive wall-follower steering. The significant findings and major conclusions from each project task are included in this report. Also summarized and included in this report are the contents of the final project reports which describe the hardware studies, the design and simulation activities, the test program, and the data base report. Recommendations for future related studies are presented.

PB80-199730 PC **A20**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume II. Design and Analysis. Part A. VLACS Models.
Final rept.,
C. M. Fry, T. McHugh, and J. Greeson. Mar 80, 470p OTIS-TTD-VLACS-050A, UMTA-IT-06-0156-79-2
Contract DOT-UT-70088
See also Volume 1, PB80-199722, and Volume 2, Part B, PB80-199748.
Also available in set of 7 reports PC E99, PB80-199714.

This report contains design and analysis results from UMTA's Vehicle Lateral Control and Switching (VLACS) Project of the Automated Guideway Transit Technology (AGTT) Program. The objective of the VLACS project is to develop lateral control and switching systems which will reduce the cost and improve the performance of these systems on automated transit vehicles. The VLACS project tasks include a review of existing lateral control and switching technology, detailed mathematical modeling, analysis, simulation, detailed hardware studies, experimentation with alternative designs, and development of guideline specifications for VLACS systems. In this report, lateral control system models are developed for wire-follower, wall-follower active, and wall-follower passive lateral control systems, including the vehicle, lateral position sensors, and actuators. Vehicle dynamic models are developed for vehicles having Ackermann steering geometry and for vehicles with wagon-wheel steering. AGT vehicle models developed include ten-degree-of-freedom models used for ride quality analysis and simpler three-degree-of-freedom models used for lateral control system design and analysis. Part A of this report contains a description of VLACS model development.

PB80-199748 PC **A23**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume II. Design and Analysis. Part B. VLACS Evaluations.
Final rept.,
C. M. Fry, T. McHugh, and J. Greeson. Mar 80, 528p OTIS-TTD-VLACS-050B, UMTA-IT-06-0156-79-3
Contract DOT-UT-70088
See also Volume 2, Part A, PB80-199730, and Volume 3, PB80-199755.
Also available in set of 7 reports PC E99, PB80-199714.

This report contains design and analysis results from UMTA's Vehicle Lateral Control and Switching (VLACS) Project of the Automated Guideway Transit Technology (AGTT) Program. The objective of the VLACS project is to develop lateral control and switching systems which will reduce the cost and improve the performance of these systems on automated transit vehicles. The VLACS project tasks include a review of existing lateral control and switching technology, detailed mathematical modeling, analysis, simulation, detailed hardware studies, experimentation with alternative designs, and development of guideline specifications for VLACS systems. In this report, lateral control system models are developed for wire-follower, wall-follower active, and wall-follower passive lateral control systems, including the vehicle, lateral position sensors, and actuators. Vehicle dynamic models are developed for vehicles having Ackermann steering geometry and for vehicles with wagon-wheel steering. AGT vehicle models developed include ten-degree-of-freedom models used for ride quality analysis and simpler three-degree-of-freedom models used for lateral control system design and analysis. Part B of this report contains systems evaluations.

PB80-199755 PC **A08**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume III. Detailed Hardware Studies.
Final rept.,
T. Evans, F. Mayer, G. Haines, and W. Oliver. Mar 80, 169p OTIS-TTD-VLACS-051, UMTA-IT-06-0156-79-4
Contract DOT-UT-70088
See also Volume 2, Part B, PB80-199748, and Volume 4, PB80-199763.
Also available in set of 7 reports PC E99, PB80-199714.

Volume III, this report, contains a description of the hardware for the test vehicle and for nominal vehicle design for each of four vehicle classes (Shuttle Loop Transit, Group Rapid Transit Large, Group Rapid Transit Small, and Personal Rapid Transit) is described. The test vehicle which incorporates 2 or 4 wheel Ackerman steering and 2 or 4 wheel drive is configured to implement wire and wall-follower steering systems. Test data is used for mathematical model validation and for lateral control system evaluations. Nominal vehicle designs are described which are typical of lateral control system implementations used on AGT systems. Cost and weight estimates for the typical designs are presented.

PB80-199763 PC **A07**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume IV. Test Program.
Final rept.,
G. Peckham, M. Fry, F. Mayer, and G. Haines. Mar 80, 139p OTIS-TTD-VLACS-052, UMTA-IT-06-0156-79-5
Contract DOT-UT-70088
See also Volume 3, PB80-199755, and Volume 5, PB80-199771.
Also available in set of 7 reports PC E99, PB80-199714.

In this report, major emphasis is given to the results of three alternative steering techniques using the VLACS test vehicle and simulations. Use of test data for mathematical model validation is discussed. The three types of steering systems for rubber-tired transit vehicles which have been investigated are: (1) mechanical sensing without power steering (herding); (2) mechanical sensing with power steering; and (3) electromagnetic (wire-follower) sensing.

PB80-199771 PC **A07**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume V. Data Base.
Final rept.,
M. J. Gray. Aug 79, 135p OTIS-TTD-VLACS-053, UMTA-IT-06-0156-79-6
Contract DOT-UT-70088
See also Volume 4, PB80-199763, and Volume 6, PB80-199789.
Also available in set of 7 reports PC E99, PB80-199714.

Volume V, this report, provides a catalog of the data base material gathered and classified as part of the VLACS project. It contains (1) an annotated bibliography, which includes short summaries of the documents listed, a list of descriptors, and a series of user designators, and (2) a subject index, which includes numerous entries and subentries, and cross-references. The data base lists technical works dealing with vehicle lateral control, switching and steering systems, vehicle dynamics, ride quality, and other related topics. Its purpose is to help planners and designers find the material they need to evaluate and select automated guideway transit (AGT) systems.

PB80-199789 PC **A14**/MF **A01**
Otis Elevator Co., Denver, CO. Transportation Technology Div.
Vehicle Lateral Control and Switching. Volume VI. Software Manual.
Final rept.,
C. M. Fry, and T. McHugh. Mar 80, 323p OTIS-TTD-VLACS-054, UMTA-IT-06-0156-79-7
Contract DOT-UT-70088
See also Volume 5, PB80-199771.
Also available in set of 7 reports PC E99, PB80-199714.

In this report, a description of the software developed for the VLACS project for study of AGT vehicle lateral control and switching systems is discussed. A simulation employing a ten-degree-of-freedom vehicle model for ride quality analysis and a simulation employing a three-degree-of-freedom vehicle model for lateral control studies are described. Also included is a description of the VLACS switching system analysis program.

PB80-200066 PC **A09**/MF **A01**
Kinetic Research, Goleta, CA.
Effects of Recent Vehicle Design Changes on Safety Performance. Volume I.
Final rept. Oct 77-Mar 79,
D. Redmond, B. Schmitz, and K. Friedman. Mar 79, 179p KR-TR-032-VOL-1, DOT-HS-805 378
Contract DOT-HS-7-01759
See also Volume 2, PB80-200074.

Design changes in 1974-1977 model year passenger cars have been identified and a preliminary

evaluation has been made of the safety effects of design changes inspired by fuel economy requirements. The 1977 General Motors full-size cars and the Volkswagen Rabbit were found to be the only significant design change vehicles. These vehicles do not demonstrate significantly higher risks of fatality in accidents than do other vehicles of similar weight or roominess. Little change is observed in the aggregate characteristics of the 1974-1977 vehicle fleets, although the effects of the 1977 General Motors downsizing are observable. Methodologies have been implemented for the identification of vehicle design changes, for the calculation of observed fatality rates by make and model, and for the projection of future fatality and injury experience based on perceived trends in vehicle design and sales.

PB80-200074 PC **A13**/MF **A01**
Kinetic Research, Goleta, CA.
Effects of Recent Vehicle Design Changes on Safety Performance. Volume II.
Final rept. Oct 77-Mar 79,
D. Redmond, B. Schmitz, and K. Friedman. Mar 79, 288p KR-TR-032-VOL-2, DOT-HS-805 379
Contract DOT-HS-7-01759
See also Volume 1, PB80-200066.

Design changes in 1974-1977 model year passenger cars have been identified and a preliminary evaluation has been made of the safety effects of design changes inspired by fuel economy requirements. The following appendices are enclosed: Ranking of changes in curb weight 1974 to 1977 model year passenger cars; Unranked tabulation of scaled fractional changes in all parameters 1974 to 1977 model year passenger cars; Ranked differences of subject models from models of similar roominess; Models most similar to given models based on average scaled fractional difference over nine design parameters; Make and model coding tables FARS and VW engineering model data base; Excerpts from April 1978 progress report; Output from run 1 and 1 of the Kraesp model; and Comparison of alternative input data to the Kraesp model.

PB80-813272 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Tire Hydroplaning. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Guy E. Habercom, Jr. Jul 80, 146p
Supersedes NTIS/PS-79/0800 and NTIS/PS-78/0776.

Studies are cited on the interaction of an automotive or aircraft tire with a wet pavement resulting in reduced traction, skidding, or complete loss of contact under certain conditions. The discussions cover the composition and surface characteristics of highway and runway pavements, the acquisition or retention of water films on roads during rainfall, skid resistance and antiskid measures, tread engineering, testing and measuring equipment and methodology, critical speeds, wheel spindown, water depth factors, rolling contact loads, and associated topics. (This updated bibliography contains 138 citations, 12 of which are new entries to the previous edition.)

13G. Hydraulic and Pneumatic Equipment

PB80-808603 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Axial Flow Compressors. 1974-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1974-Apr 80,
Robert Hippler. May 80, 217p
Sponsored in part by National Technical Information Service, Springfield, VA.

Various axial-flow compressors, used in jet engines, gas turbines, turbo fans, ultra centrifuges, and in other turbo machinery, are treated in these abstracts. Citations center on design, including blades and rotors, and materials, measurements of flow, performance, and applications. (Contains 200 citations)

13H. Industrial Processes

AD-A085 833/2 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Operations Research Center
The Introduction of Feedback Into a Hierarchical Production Planning System.
Technical rept.,
Stephen C. Graves. Mar 80, 30p Rept no. TR-177
Contract N00014-75-C-0556

This paper proposes and tests a framework for decomposing a large scale production planning problem, modeled as a mixed-integer linear program. We interpret this decomposition in the context of Hax and Meal's hierarchical framework for production planning. The procedure decomposes the production planning problem into two subproblems which correspond to the aggregate planning subproblem and a disaggregation subproblem in the Hax-Meal framework. The linking mechanism for these two subproblems is an inventory consistency relationship which is priced out by a set of Lagrange multipliers. The best values for the multipliers are found by an iterative procedure which may be interpreted as a feedback mechanism in the Hax-Meal framework. At each iterative, the procedure finds both a lower bound on the optimal value to the production planning problem and a feasible solution from which an upper bound is obtained. Our computational tests show that the best feasible solution found from this procedure is very close to optimal. For thirty-six test problems the percentage deviation from optimality never exceeds 4.4%, and the average percentage deviation is 2.2%. Twenty-seven of the test problems are mixed-integer linear programs with 240 zero-one variables, while nine test problems have 480 zero-one variables. (Author)

AD-A086 152/6 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Operations Research Center
Hierarchical Production Planning: A Two Stage System.
Technical rept.,
Gabriel R. Bitran, Elizabeth A. Haas, and Arnoldo C. Hax. May 80, 37p Rept no. Tr-179
Contract N00014-75-C-0556

This paper presents a hierarchical approach to plan and schedule production in a manufacturing environment that can be modeled as a two stage process. A conceptual framework for this approach is described. The specific mathematical models proposed for the various hierarchical levels are discussed. The methodology is evaluated in an actual setting. The performance of the hierarchical system is contrasted with an MRP design. Encouraging results are reported. (Author)

AD-A086 163/3 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Operations Research Center
Hierarchical Production Planning: A Single Stage System.
Technical rept.,
Gabriel R. Bitran, Elizabeth A. Haas, and Arnoldo C. Hax. Mar 80, 45p Rept no. TR-174
Contract N00014-75-C-0556

This paper presents a hierarchical approach to plan and schedule production in a manufacturing environment that can be modelled as a single stage process. Initially, the basic trade-offs inherent to production planning decisions are represented by means of an aggregate model, which is solved on a rolling horizon basis. Subsequently, the first solution of the aggregate plan is disaggregated, considering additional cost objectives and detailed demand constraints. Several improvements in the methodology related to hierarchical production planning are suggested. Special attention is given to alternative disaggregation procedures, problems of infeasibilities, and the treatment of high setup costs. Computational results, based on real life data, are presented and discussed. (Author)

N80-26295/9 PC **A03**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Quality of Nonmetallic Materials Qualite des Materiaux Non Metalliques.
G. Hilaire. 28 Aug 79, 38p SNIAS-792-551-108
Text in French. Presented at Forum Intern. Mater. Composites, Collage et Adhesion, Lyon, 11-14 Sep. 1979.

Some philosophical and practical considerations are put forward concerning the difficulties of ensuring adequate quality control. Relevant parameters are defined. Composition, guarantees as far as raw materials are concerned, and manufacturing procedures are discussed. Fabrication parameters (ambient conditions, polymerization conditions, manufacturing time) are examined together with the qualities of individual manufactured parts, failure probabilities and the nondestructive testing procedures employed. The results of some specific tests and experiments are given.

N80-27204/0 PC **A04**/MF **A01**
AEG-Telefunken, Heilbronn (Germany, F. R.). Geschaeftsbereich Halbleiter.
Advanced Ion Implantation Techniques.
Final Report.
A. Kostka, and W. Quast. Oct 79, 72p BMFT-FB-T-79-37
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Three different applications of ion implantation techniques were developed and tested for their production compatibility. The implantation of gold ions into the back of diode wafers allowed a more precise control of reverse recovery times than with conventional methods. The implantation of boron ions into the region near the surface of pnp transistors suppressed effects caused by inversion of the collector zone. Using the lateral component during diffusion from implanted sources, HF MOSFETS were fabricated with very small channel lengths.

PATENT-4 201 618 Not available NTIS
Department of the Navy Washington DC
Apparatus for Curing Adhesively Joined Fiber Optic Elements.
Patent,
Adolph L. Lewis. Filed 21 Jul 78, patented 6 May 80, 5p AD-D007 350/2, PAT-APPL-926 978
Supersedes PAT-APPL-926 978-78, AD-D005 311.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus and method is provided for adhesive bonding together of fiber optic elements, i.e. fibers, utilizing a light source and an adhesive that will be cured by said light source, the adhesive being irradiated by the light and cured around the entire connection at the same time to provide a uniformly stressed bonded connection. (Author)

PB80-808801 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cold Working of Materials. 1973-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1973-Apr 80,
C. Gilbert Young. May 80, 216p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cold working of metals and metal fatigue failure as a result of cold flexing or repeated strain, are the subjects of this retrospective collection of abstracts. Some subjects covered are cold rolling, drawing, straining, forging, sintering, extrusion, forming, and plastic surface deformation. Metallurgical aspects of the cold working process are discussed. (Contains 192 citations)

PB80-808819 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cold Working of Materials. 1976-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1976-Apr 80,
C. Gilbert Young. May 80, 200p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cold working of metals, polycarbonate, and metal fatigue failure as a result of cold flexing or repeated strain, are the subjects of this retrospective collection of abstracts. Some subjects covered are cold rolling, drawing, straining, forging,

sintering, extrusion, forming, and plastic surface deformation. Metallurgical aspects of the cold working process are discussed. (Contains 199 citations)

PB80-808827 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cold Working of Materials. 1976-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Apr 80,
C. Gilbert Young. May 80, 142p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cold working of metals, and metal fatigue failure as a result of cold flexing or repeated strain, are the subjects of this retrospective collection of abstracts. Some subjects covered are cold rolling, drawing, straining, forging, sintering, extrusion, forming, and plastic surface deformation. Metallurgical aspects of the cold working process are discussed. (Contains 136 citations)

PB80-808983 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gold Plating Processes. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. Jun 80, 53p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts cover processes for producing a gold plating, such as sputtering, electroless deposition, and electrodeposition. Applications in electronics, aerospace, spectacle frames and jewelry, architectural glass, electrical equipment, scientific work, and other areas, are listed. Ways to reduce the use of gold, or alternatives to its use, are discussed. (Contains 147 citations)

PB80-808991 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gold Plating Processes. 1972-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Apr 80,
C. Gilbert Young. Jun 80, 86p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts cover processes for producing a gold plating, such as sputtering, electroless deposition, and electrodeposition. Applications in electronics, aerospace, spectacle frames and jewelry, architectural glass, electrical equipment, scientific work, and other areas, are listed. Ways to reduce the use of gold, or alternatives to its use, are discussed. (Contains 84 citations)

PB80-809254 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Shot Cleaning and Blasting. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 52p
Sponsored in part by National Technical Information Service, Springfield, VA.

This collection of abstracts covers abrasive cleaning, blasting and machining, shot blasting and cleaning, and blast cleaning. Materials cleaned include metals, plastics, coramics, road surfaces and marine equipment. The advantages, disadvantages and techniques used for these cleaning methods are delineated. (Contains 37 citations)

PB80-809262 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Shot Cleaning and Blasting. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 32p
Sponsored in part by National Technical Information Service, Springfield, VA.

This collection of abstracts covers abrasive cleaning, blasting and machining, shot blasting and cleaning, and blast cleaning. Materials cleaned include metals, plastics, ceramics, road surfaces and marine equipment. The advantages, disadvantages and techniques used for these cleaning methods are delineated. (Contains 26 citations)

PB80-809270 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Steel Carburization. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 72p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts discuss the carburization of steels, and the properties of the resultant product. Hardness, pitting resistance, corrosion resistance, wear properties and impact resistance of carburized steels are described. Many practical applications of carburized steel parts in the automotive industry, machine tools, and in other areas, are delineated. (Contains 53 citations)

PB80-809288 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Steel Carburization. 1972-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Apr 80,
C. Gilbert Young. May 80, 39p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts discuss the carburization of steels, and the properties of the resultant product. Hardness, pitting resistance, corrosion resistance, wear properties and impact resistance of carburized steels are described. Many practical applications of carburized steel parts in the automotive industry, machine tools, and in other areas, are delineated. (Contains 30 citations)

PB80-809296 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Steel Carburization. 1976-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1976-Apr 80,
C. Gilbert Young. May 80, 178p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts discuss the carburization of steels, and the properties of the resultant product. Hardness, pitting resistance, corrosion resistance, wear properties and impact resistance of carburized steels are described. Many practical applications of carburized steel parts in the automotive industry, machine tools, and in other areas, are delineated. (Contains 186 citations)

PB80-809379 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Titanium: Castings and Casting. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 80p
Sponsored in part by National Technical Information Service, Springfield, VA.

The fabrication through casting of titanium, and various titanium alloys, is covered in the cited abstracts. Hot isostatic pressing (HIP) and other densification techniques are described. A number of applications and uses of cast titanium parts are included. (Contains 68 citations)

PB80-809387 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Titanium: Castings and Casting. 1970-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 86p
Sponsored in part by National Technical Information Service, Springfield, VA.

The fabrication through casting of titanium, and various titanium alloys, is covered in the cited abstracts. Hot isostatic pressing (HIP) and other densification techniques are described. A number of applications and uses of cast titanium parts are included. (Contains 92 citations)

PB80-809395 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Titanium: Castings and Casting. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 49p
Sponsored in part by National Technical Information Service, Springfield, VA.

The fabrication through casting of titanium, and various titanium alloys, is covered in the cited abstracts. Hot isostatic pressing (HIP) and other densification techniques are described. A number of applications and uses of cast titanium parts are included. (Contains 44 citations)

PB80-813207 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Machine Automation and Numerical Control. July, 1977-June, 1980 (Citations from the NTIS Data Base).
Rept. for Jul 77-Jun 80,
Guy E. Habercom, Jr. Jul 80, 298p
Supersedes NTIS/PS-79/0797 and NTIS/PS-78/0753. See also 1964-1970, NTIS/PS-75/480, 1971-1973, NTIS/PS-75/481, and 1974-June, 1977, NTIS/PS-78/0752.

Automation of machines and machine tools and numerical control methods are investigated in the cited reports. Manufacturing techniques, production control, and process control methods are reviewed. (This updated bibliography contains 290 citations, 78 of which are new entries to the previous edition.)

13I. Machinery and Tools

AD-A085 942/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Investigation of Deterioration of Drills with Treatment of Steel EI654,
L. Sh. Shuster. 19 May 80, 9p Rept no. FTD-ID(RS)T-0753-80
Edited trans. of Trudy Ufimskiy Aviatsionnyy Institut im. Ordzhonikidze (USSR) n29 p100-104 1972, by Martin J. Folan.

No abstract available.

AD-A086 058/5 MF **A01**
Tension Member Technology Westminster CA
Military Adaptation of Kevlar for Portable Bridge Reinforcement Cables.
Final rept. 5 Jan 78-15 May 79,
Harold D. Wolfe, and Philip T. Gibson. 18 Jun 80, 211p
Contract DAAK70-78-C-0024
Availability: Microfiche copies only.

This report prepared by Tension Member Technology, presents the findings of adapting existing small and large Kevlar Ropes to Military Bridging. The data obtained during the program was used to construct large diameter cables for reinforcement on a rapidly emplaced, portable military bridge. (Author)

N80-26673/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France). Lab. Centrale.
Effect of the Water Content of Oil in Gear Boxes on Their Lifetimes Influence de la Teneur en Eau de l'Huile de Boites d'Engrenages sur Leur Duree de Vie.
J. Odorico, and J. Philippe. 7 Aug 79, 10p
SNIAS-792-551-105
Text in French. Presented at Groupement pour l'Avan. De la Mecan. Ind. Conf. (Journees d'Etudes sur la Fatigue-Corrosion).

Fatigue tests were carried out on gears cut out of 16NCD 13 and subject to the following treatment: machining, cementing, quenching and tempering, and rectification. Behavior with ordinary oil and oil

with additional water (0.15 to 0.20%) was investigated. The apparatus simulating real conditions is described and the results obtained are given. Two types of control appear to be necessary: determination of the water content of fresh oil after storage, monitoring the magnesium content of oil sampled from operational gear boxes (the excess acidity caused by the water attacks the casing) using spectroscopic methods or simple visual inspection (blackening of the oil).

N80-26674/5 PC **A03**/MF **A01**
General Electric Co., Whetstone (England). Reactor Equipment Ltd.
ROTOR: A Fortran Program to Calculate the Critical Speeds of Rotating Shafts.
P. Brooks, and D. L. Duffett. Jan 79, 41p REL/R(79)2, REL/TM(78)23
Supersedes Rel/TM(78)23.

A computer program is described written in FORTRAN for the PDP 11-70 which can be used to calculate any number of critical speeds of transverse vibration of a rotating shaft supported in two bearings. It can deal with a shaft of variable cross section, with hollow or solid sections, and carrying additional discs. In the calculations the resistance of the bearings and the gyroscopic effects are taken into account. Operating instructions, method of calculation, comparisons made with other methods of calculation, and test problems are given.

N80-26675/2 PC **A02**/MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Space Tribology Tests and Experiments.
Progress Report, 1978.
E. J. Robbins. Sep 79, 14p ESA-ESTL-43, ESA-CR(P)-1310
Contract ESA-2584/75-MD

Mechanism tests and experiments in support of tribological research are described. Thermal vacuum tests of various solar array drive mechanisms to be used on satellites are reported on. In addition, results from slip ring tests, sleeve bearing tests, and boom hinge bearing tests are given. The torque of ball bearings using dry lubricants, the relative lubricity of oils, and cage effects in oil lubricated bearings are considered. Ball bearings with titanium carbide coated balls are also investigated.

N80-26677/8 PC **A03**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F. R.). Betriesbereich.
Vibration Absorbers for Damping of Solid State Noise.
Final Report.
H. Albrecht. May 79, 45p BMFT-FB-HA-79-03
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Methods were studied to damp mechanical vibrations of machines in industrial plants and thus achieve noise reductions. It is shown that metal bar absorbers of various shapes are more efficient than antidrumming compounds and sand of the same mass. Tests on industrial machines showed that noise reductions of up to 7 dB could be achieved.

N80-26678/6 PC **A03**/MF **A01**
Southampton Univ. (England). Inst. of Sound and Vibration Research.
Diagnostics of Gear Assembly: A New Approach Using Impact Analysis.
M. F. Ranky. Aug 78, 29p ISVR-TR-100

A technique which employs torsional excitation and an accelerometer fitted to the structure is used to estimate the backlash distribution of gears in mesh. Imperfections in circularity are computed from measured data in terms of absolute phase lags and normalized magnitudes. The theoretical concepts are outlined and results of experiments are presented.

PAT-APPL-6-163 840 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
An Improved Head for High Speed Spinner Having a Vacuum Chuck.
Patent Application,
F. Lombardi. Filed 27 Jun 80, 12p N80-26661/2, NASA-CASE-NPO-15227-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A head for a high-speed spinner is characterized by a cylindrical body adapted to be mounted at the distal end of a vertically oriented drive shaft. A vacuum chuck having an upwardly facing chamber is circumscribed by an annular surface for receiving a silicon chip. An ordered array of low-pressure cavities is defined about the periphery of the body and is connected with the chamber via radially extended bores for translating low pressures to the chamber as the head is angularly displaced. A pressure differential is thus established across the chip for securing it to the head.

PB80-196272 PC **A06**/MF **A01**
Spin and Space Systems, Inc., Phoenix, AZ.
Magnetic Suspension for Rotating Equipment, Phase I.
Project rept. (Final),
K. Reistad, W. Ellison, and G. Yonkovich. Mar 80, 119p NSF/RA-800046
Grant NSF-DAR79-16703

A study is presented which investigates the feasibility and design criteria for employing magnetic suspension in mechanisms intended for high rotational precision. Magnetic suspension is useful for applications requiring high speed rotor pointing and/or speed control in high precision instrumentation. The study includes a survey of magnetic suspension types and their basic characteristics. Attention is focused on control systems and magnetic circuit design and their interrelationships with the assembly structure and other components. Major results of the study include: (1) relationships for determining pole-piece, magnet, and control coil configuration, sizing, and material properties trade-offs; (2) identification of the nature and extent of needs for empirical design data; (3) extensive analysis of control gain and phase stability criteria, requisites of feedback elements, and compensation techniques; and (3) evaluation of rotor dynamics and prospective means for augmenting radial and angular stiffness and damping. Information gained is applicable to the design of static and linear suspensions as well as to high speed applications. Advantages foreseen are increased drag, preclusion of wear degradation, and very low sensitivity to ambient disturbances. The report concludes that a magnetic suspension for rotor speeds exceeding 50K rpm and a skin axis accuracy of 0.1 arc second appear feasible.

UVA-ER-515-79U PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Polar Plots Using UVA Rotor. Final Report.
S. L. Hendricks. Dec 79, 14p
Contract EY-76-C-05-1779

The rotor model developed at UVA is designed to find vibration frequencies, damping factors, and mode shapes for a flexible rotor which includes a top and bottom suspension system. The UVA Rotor does not incorporate the effects of imbalance. Alterations necessary to include an imbalance weight in the formulation of the UVA Rotor so that the code can be used to generate polar plots for experimental comparison are described. (ERA citation 05:022780)

13J. Marine Engineering

AD-A085 870/4 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Aviation and Surface Effects Dept
The Power-Augmented-Ram Landing Craft Concept.
Summary rept.,
Fred H. Krause. Mar 80, 41p Rept no. DTNSRDC/ASED-80/03

The Power-Augmented-Ram Landing Craft (PARLC) concept, combining surface effect ship and power-augmented-ram technology into one vehicle, was formulated in early FY-79. This report summarizes the analytical studies and model tests of the PARLC to date. These investigations show the PARLC is capable of transiting a 100-nm distance from ship to shore at speeds in excess of 90 knots while carrying a 240,000-lb payload. (Author)

AD-A085 924/9 PC **A07**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Simulation Analysis of Automatic and Quickened Manual Control during Underway Replenishment.
Final rept.,
Samuel H. Brown, and Joseph G. Dimmick. Jun 80, 141p Rept no. DTNSRDC-80/007

This final report summarizes the final results and conclusions of a program to define and analyze the control parameters affecting the dynamic interactions between two ships during Underway Replenishment (UNREP) and to make recommendations for a prototype ship separation monitoring system. Results of hybrid computer simulations of UNREP by two identical, Mariner class ships, including consideration of nonlinear maneuvering equations, regular waves, severe first- and second-order irregular-wave excitations, time-sampled separation measurements, and low-pass filters, are presented. Contrary to earlier assumptions, first-order irregular-wave excitations were found to dominate the UNREP control problem. Use of either automatic or quickened manual control was found to be feasible, but work is needed to define the capabilities and limitations of quickening in this application. Recommendations for development of a prototype ship separation sensing system are presented. (Author)

AD-A085 965/2 PC **A04**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Evaluation of Bulbous Bows Derived from Wave Spectra Analysis on the LSD 41 (Model 5367).
Final rept.,
Steven C. Fisher. Jun 80, 51p Rept no. DTNSRDC/SPD-0049-13

Bulbous bows were designed for LSD 41 Model 5367 using a theoretical approach developed by Sharma which uses data from longitudinal wavecut experiments. The performances of the bulbs are compared to that of the original design bulb. The results indicate that the wavecut bulbs have the same or lower resistance at higher speeds than the original bulb for the model. (Author)

AD-A086 019/7 PC **A09**/MF **A01**
Newport News Shipbuilding Co VA
Further Survey of In-service Performance of Structural Details.
Final rept. Dec 77-May 79,
Charles R. Jordan, and L. T. Knight. May 80, 189p 1018-M, SSC-294
Contract DOT-CG-75172-A
Continuation of Rept. no. SSC-272 dated Mar 78, AD-A057 212.

This project is an adjunct to the Ship Structure Committee report SSC-272. Using the same survey techniques and data analysis procedures described in that report, the midship/cargo areas of an additional twelve bulk carriers, twelve containerships, and twelve general cargo ships were surveyed under Project SR-1258. The goal of both projects is to provide design and repair personnel with structural service data and recommendations that can be used to significantly decrease the number of detail failures that occur on ships of all types. The data from both surveys are combined and summarized for ready use by design and repair offices. Structural detail failure data were collected for twelve detail families (beam brackets, tripping brackets, non-tight collars, tight collars, gunwale connections, knife edge crossings, miscellaneous cutouts, clearance cuts, deck cutouts, stanchion ends, stiffener ends, and panel stiffeners) to provide guidance in the selection of structural detail configurations. Plots of percent failures versus ship type allow an engineer/designer to establish failure trends for a specific ship type. a total of 607,584 details were observed with a total of 6,856 failures. Failures were attributed to either one or a combination of five categories - design, fabrication, welding, maintenance, and operation. (Author)

AD-A086 028/8 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
Torpedo Hydrodynamic Parameter Estimation: Application to Shallow Water Mobile Platform (SWAMP) Sea Run Data.
Research rept. Mar 77-Sep 79,
L. A. Lopes. 1 Feb 80, 34p Rept no. NOSC/TR-496

The Shallow Water Mobile Platform (SWAMP) is a specially instrumented torpedolike vehicle whose purpose is to gather acoustic research data. A model of SWAMP, based on torpedo motion equations with six degrees of freedom, is presented here. Multiplexed dynamic data employed include clock time, body angular rate components, control surface deflections, propeller rotation speed, vehicle course, and depth. First-order maximum likelihood identification algorithms are used as a guide in parameter estimation. These algorithms yield an estimation of the state of the system by means of an extended 'Kalman' type filter, as well as a weighted quadratic function of the residues (i.e., differences between measurements and their computed values) as the maximum likelihood cost function. The filter computes an estimate of the full SWAMP trajectory. A cost function is provided in the form of a weighted sum of squares of the residues of the rate gyros and accumulators. Of gradient techniques investigated for the minimization of the cost function, the Fletcher-Powell technique was found to be superior (as modified because of the extreme sensitivity of the roll-damping coefficient), and only results for this technique are presented. (Author)

PATENT-4 195 962 Not available NTIS
Department of the Navy Washington DC
Platform Loading System.
Patent,
Gordon J. Laskowski, and Richard I. Schrick.
Filed 29 Jan 76, patented 1 Apr 80, 12p AD-D007 339/5, PAT-APPL-653 419
Supersedes PAT-APPL-653 419-76, AD-D003 546.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a platform loading system having an elevator platform mounted loader unit and a magazine mounted loader unit in each magazine served by the loader system. Each loader unit consists of one cargo tray and its associated tray transfer machinery. In each loader unit a cargo tray may occupy one of two positions, an upper position or a lower position. The load to be transferred is always carried by a tray in the upper position. Transfer of weapons between elevator platforms and magazines consists of a simultaneous exchange of a loaded and empty tray between mating loader units. The loaded tray traveling in the upper position passes over the empty tray in the lower position heading in the opposite direction. At completion of tray exchange, loaded trays may be off-loaded and the now empty tray lowered to the lower tray position by a tray jacking system as required by the next exchange operation. Conversely, the empty tray in the lower position can be raised to the upper position and on-loaded if required by the next operation. The trays are flush with the deck and can be on or off-loaded by either overhead handling, wheeled dollies, fork lift trucks, or the like. Loader equipped elevator platforms with the tray in the upper position can be utilized as a conventional elevator platform in the event platform loader operation is not desired.

PB80-197940 PC **A04**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Anchor Chain for Future U.S. Navy Vessels.
Final rept.
Jun 80, 55p NMAB-371
Contract MDA 903-78-C-0038
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

Large anchor chain used by the U.S. Navy has been made by the die lock forging process developed at the Boston Naval Shipyard. This facility has been closed, and no commercial manufacturer in this country is currently making chain of the size needed (4-3/4 in.) for large aircraft carriers. The options open to the Navy are discussed. These options include the manufacture of die lock chain by industry, utilizing the dies being stored by the Navy. Welded chain could be made in the United States or purchased abroad. For the long term, the committee recommends the rapid development of welded chain, starting with the smaller sizes, for use by the Navy. The immediate problem, supplying chain to carriers under construction or expected to be built soon, should be solved by a resumption of die lock chain manufacture if equipment (large presses, heat treating furnaces, and chain transport), dies, and skills are available.

PB80-199979 PC **A10**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
A Technical and Economic Evaluation of the Minitrailership Concept for the United States Merchant Marine.
Final rept.
Mar 80, 207p MA-RD-940-80048
Contract MA-6-38065

The historical trend in the U.S. Merchant Marine has been towards larger, more expensive ships. However, a number of foreign flag carriers successfully operate small trailerships in various trades. Several vessel designs and operational characteristics have been suggested to permit U.S.-flag operation of small trailerships. The object of this study was to determine whether U.S.-flag operators could successfully penetrate the small trailership market. It was found that over 80 small trailerships would be required in the U.S. mainland to the Caribbean trade area, and that 10 additional ships would be needed in trade between Puerto Rico and the other Caribbean islands. A small number of vessels will also be needed in trade across the Great Lakes between the U.S. and Canada. It was found that potential U.S. operators of those ships would be at a disadvantage, compared to foreign operators, due to higher U.S. operating costs. The report studied some innovative means of reducing these costs.

PB80-201353 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Ocean Engineering.
Remotely Operated Vehicles - An Overview.
Technical rept.,
Joseph R. Vadus, and R. Frank Busby. Dec 79, 24p NOAA-TR-00E-6, NOAA-80052902
Prepared in cooperation with Busby (R. Frank) Associates, Arlington, VA. See also report dated Aug 79, PB80-131881.

Four types of remotely operated vehicles (ROV's) are identified. The growth, application and utilization of the more than 180 vehicles constructed and under development is discussed. Current operational problems vary, but cable entanglement and system reliability are the dominant technical liabilities. Current development trends are aimed at specialized vehicles and equipment for support of offshore oil and gas exploration, development and production. The advent of low-cost, simplified ROV's has placed this technology in the hands of virtually any activity involved in utilization and investigation of the marine environment. This overview identifies vehicles developed by worldwide organizations.

PB80-812977 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Supertankers and Superports. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Guy E. Habercom, Jr. Jul 80, 209p
Supersedes NTIS/PS-79/0849 and NTIS/PS-78/0814.

Construction and operation of supertankers and requirements for port facilities are reviewed in these Government-sponsored research reports. The environmental aspects are investigated. (This updated bibliography contains 204 citations, 17 of which are new entries to the previous edition.)

PB80-812985 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Supertankers and Superports. 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jun 80,
Guy E. Habercom, Jr. Jul 80, 126p
Supersedes NTIS/PS-79/0850 and NTIS/PS-78/0815.

Construction and operation of supertankers and requirements for port facilities are reviewed in these reports gathered from worldwide literature surveys. Environmental aspects, offshore mooring sites, and harbor preparation are among the features investigated. (This updated bibliography contains 121 citations, 5 of which are new entries to the previous edition.)

PB80-813314 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Marine Fouling. 1969-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1969-Jun 80,
Guy E. Habercom, Jr. Jul 80, 327p
Supersedes NTIS/PS-79/0769 and NTIS/PS-78/0739.

Fouling of ships, docks, and underwater structures by marine organisms is reviewed in these Federally-funded research reports. Remedial treatments and coatings are investigated. Barnacle cements are analyzed. (This updated bibliography contains 322 citations, 15 of which are new entries to the previous edition.)

PB80-813322 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Marine Fouling. 1970-June, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jun 80,
Guy E. Habercom, Jr. Jul 80, 123p
Supersedes NTIS/PS-79/0770 and NTIS/PS-78/0740.

Fouling of ships, docks, and underwater structures by marine organisms is reviewed in these reports gathered in a worldwide literature survey. (This updated bibliography contains 118 citations, 17 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A086 249/0 Not available NTIS
British Ship Research Association Wallsend (England) Wallsend Research Station
Journal of Abstracts of the British Ship Research Association. Volume 34, Number 10, Abstracts 51,503-51,682, October 1979,
R. C. Kahler. 1979, 66p
See also Volume 34, Number 9, AD-A085 556.
Availability: B.S.R.A., Wallsend (England), Wallsend Research Station (No copies furnished by DTIC).

No abstract available.

PAT-APPL-6-153 123 PC **A02**/MF **A01**
Department of the Navy Washington DC
Combination Exhaust and Relief/Venting Valve.
Patent Application,
Joseph E. Kelly. Filed 27 May 80, 10p AD-D007 306/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a steam valve for use on the low pressure exhaust side of a steam turbine including a housing having an inlet and two outlets with valves upstream of the outlets for selectively permitting steam flow from the inlet to either or both of the outlets. The valve arrangement includes a main valve, which acts as a turbine exhaust isolation valve, and an auxiliary valve which acts both as a relief valve and a personnel protection valve. During operation, when the main valve is open, the auxiliary valve acts as a spring loaded relief valve to relieve upstream over-pressurization, and, when the main valve is closed, the auxiliary valve is restrained open to act as a personnel protection valve to bleed or vent any leaked steam to the atmosphere. (Author)

PATENT-4 204 552 Not available NTIS
Department of the Navy Washington DC

Dual Speed Fluid Control Apparatus.
Patent,
John P. Bott. Filed 24 Oct 78, patented 27 May 80, 5p AD-D007 354/4, PAT-APPL-954 263
Supersedes PAT-APPL-954 263-78, AD-D005 670.
Availability: This Government-owned invention available for U.S. licensing and, possible, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A dual speed fluid control apparatus is provided which includes a valve body having a high pressure passageway and a low pressure passageway extending vertically therethrough in a spaced apart relationship. The valve body has the following: an ambient pressure inlet into the top plenum, a fluid bypass outlet into the middle plenum, and a pressurized fluid inlet and fluid outlet into the bottom plenum. A valve is located within each passageway and is responsive to pressure in the bottom plenum for bypassing fluid from the bottom plenum to the middle plenum. A spring biased device is located in each passageway and is responsive to the ambient pressure in the top plenum for pushing each valve toward the closed position against the pressure in the bottom plenum. A control valve device is provided for selectively opening and closing the bottom portion of the low pressure passage way to the bottom plenum. With this arrangement the fluid control apparatus will supply high pressure fluid when the control valve means is closed and will supply low pressure fluid when the control valve means is open, both of these pressures and flow rates being varied by the magnitude of the ambient pressure in the top plenum. (Author)

PB80-195662 PC **A04**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Water and Air Quality Control with a Coil Type Filter.
Technical rept.,
Lawrence K. Wang, Richard S. Magee, and Yao Tang. 15 Feb 80, 62p STI-ME/02-80/2
Sponsored in part by Blandford Fund, Hoboken, NJ.

A coil type filter has been developed and experimentally evaluated for environmental control. The filter comprises a spiral wound coil having an inlet and an outlet at opposite ends. The inlet and outlet apertures have screens positioned to retain the filtering element within the coil. Couplings are provided on the exterior of the coil at each end for connection to other portions of a fluid flow system. The interior of the coil is filled with adsorbents, absorbents, ion exchange resins, and filter media which perform the purifying operation. The spiral wound coil may be mounted within a housing with the inlet and outlet both extending outwardly from the same portion of the housing. A thermostatically controlled heating element may be mounted within the housing to control the temperature of the fluid within the coil. It has been proven experimentally that the newly developed coil type filter can adequately remove toxic organics and heavy metals from water. Other potential applications in air quality control and resources recovery, and possible regeneration procedures are proposed and discussed.

PB80-196116 PC **A08**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
The Role of Plastic Pipe in Community Water Supplies in Developing Countries,
Frederick E. McJunkin, and Charles S. Pineo.
1971, 175p
Contract AID/csd-1888

Pipe is a major cost element of community and household water systems. In the most common diameters pipe made of plastics is competitive in cost and performance, and in many circumstances, costs less than pipe of other material. Plastic pressure pipe can be readily manufactured in developing countries with a minimum of hard-currency investment, skilled labor relative to other forms of pipe, and expenditure for imported materials, relative to production of other pipe. The intent of this report was to prepare a document which would enable engineers, administrators, public officials, industrialists, development personnel, the international banks, and others to review the role of plastic pipe in community water supply in developing countries, and to provide a resource document to support further technical or administrative action. Extensive use has been made of specialized appendices. The subject areas include the use of plastic pipe; plastic pipe standards and codes; manufacture of plastic pipe; and the market for plastic pipe. Appendices cover the topics of abbreviations; bibliography; standards and specifications for plastic pipes; a glossary of plastic piping terms; directory of manufacturers; installation of plastic pipe; and plastic pipe for sewers.

13L. Safety Engineering

DOE/ER-0053 PC **A07**/MF **A01**
Argonne National Lab., IL.
Health and Safety. Preliminary Comparative Assessment of the Satellite Power System (SPS) And Other Energy Alternatives.
L. J. Habegger, J. R. Gasper, and C. D. Brown.
Apr 80, 126p
Contract W-31-109-ENG-38

Existing data on the health and safety risks of a satellite power system and four electrical generation systems are analyzed: a combined-cycle coal power system with a low-Btu gasifier and open-cycle gas turbine, a fission power system with fuel reprocessing, a central-station, terrestrial, solar-photovoltaic power system, and a first-generation design for a fusion power system. The systems are compared on the basis of expected deaths and person-days lost per year associated with 1000 MW of average electricity generation and the number of health and safety risks that are identified as potentially significant but unquantifiable. The appendices provide more detailed information on risks, uncertainties, additional research needed, and references for the identified impacts of each system. (ERA citation 05:023847)

PB80-196074 PC **A15**/MF **A01**
Bielfeld Univ. (Germany, F.R.). Fakultaet fuer Soziologie.
Strassenverkehrsbeteiligung Alterer Menschen (Elder People as Road Users),
Reinhard Wittenberg. 1977, 337p
Text in German, abstract in English. Pub. in Unfall- und Sicherheitsforschung Strassenverkehr, heft 11, 1977. Sponsored in part by Bundesanstalt fuer Strassenwesen, Cologne (Germany, F.R.).

The objective of this investigation was to collect basic data on the nature, duration and frequency as well as the purpose and the aim of the participation of elder people in traffic in the Federal Republic of Germany. By means of a multilevel selection procedure and questionnaire inquiries combined with an analysis of the time distribution of the type of participation in traffic, data on the behavioral attitudes of elder people in traffic was collected. The age of the road users observed had been limited by the authors to at least 60 years. The discussion on the characteristics and behavior patterns of this group as well as the justification of the methodical approach are followed by the description of the ecological and regional aspects of the way of life of the questioned group. The questionnaire findings and the results of the analyses of participation in traffic are provided with a special distinction made between time, regional, and personal influence factors. Some comments on the involvement in accidents and on safe (or unsafe) feelings of elder road users as well as suggestions about measures aiming at improving road safety and proposals on initiation of new research activities complete this report.

PB80-197981 PC **A07**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Supervisory Guidelines for Motor Vehicle Inspection Programs.
Final rept. 26 Sep 76-31 Dec 77,
Stephen T. McDonald, Robert A. Romberg, Rex D. Hume, D. Keith Miller, and James A. Palmer.
May 80, 132p DOT-HS-805 358
Contract DOT-HS-6-01516

The report is a manual of administrative guidelines designed to assist the program manager in administering a state inspection program. The manual includes practical guidelines covering the areas of organization, staffing, legal management, station licensing and supervision, inspector training and licensing, public relations, data management, and program coordination. The guidelines are generally applicable to all types of motor vehicle inspection programs and focus in on the most frequently used type of system, the state-licensed system of inspection. The manual includes an analysis of the problem and recommendations based on summaries of vehicle inspection program procedures received through the mail from 39 states, telephone interviews with 26 states which use the state-licensed system, and visits to 5 states which were carefully selected to properly represent the different types of state-licensed systems. The recommended guidelines are specifically developed to attack the weaknesses identified and reflect procedures already in use by some of the states or suggested in the literature. The contents of this manual provide the program administrator with an easily usable guide to aid in the identification of problem areas and to improve the quality of inspection services provided.

PB80-198005 PC **A04**/MF **A01**
Bundesanstalt fuer Strassenwesen, Cologne (Germany, F.R.).
Merkblatt zur Gestaltung und Sicherung von Schulwegen (Instructions for the Design and Safety of Children's Ways to School).
1977, 57p
Text in German, abstract in English. Pub. in Unfall- und Sicherheitsforschung Strassenverkehr, heft 12, 1977.Color illustrations reproduced in black and white.

In order to provide the public and private institutions who concern themselves with the safety of children's ways to school with the necessary information to fulfill their task, instructions are issued which confront examples of the design of ways to school with the laws in force, other rules and regulations and research results in this field. The instructions contain suggestions with regard to community development planning, transportation plan, road design, traffic rules and regulations, boundaries of school districts, participation in traffic under the guidance of third persons, children's equipment (clothes, bicycles) and traffic education. Those ways to school are dealt with which can be walked or driven by bicycle. The problems of motorized students or students transported by school busses are given marginal attention only. For the persons responsible and those affected, the instructions contain a catalog of possible measures which, taking account of the local conditions prevailing, can be laid down in the form of maps of ways to school.

PB80-198021 PC **A07**/MF **A01**
Bundesanstalt fuer Strassenwesen, Cologen (Germany, F.R.).
Grundlagen zum Zweiradverkehr (Fundamentals of Two-Wheel Traffic).
1977, 141p
Text in German, abstract in English. Pub. in Unfall- und Sicherheitsforschung Strassenverkehr, heft 9, 1977.

In order to provide a comprehensive basis for information and study purposes on the subject of two-wheel traffic, the data available in the Federal Republic of Germany is summarized. An optimal value for a speed limit applying to light motorcycles is deduced with respect to traffic safety and to the possibly high acceptance by cyclists. Criteria for registration and use of light motorcycles are discussed in relation to other factors such as the behavior of driver and vehicle, driving education and traffic flow.

PB80-198039 PC **A15**/MF **A01**
Bundesantalt fuer Strassenwesen, Cologne (Germany, F.R.).
Typische Fehlverhaltensweisen von Fahranfangern und Moglickeiten Gezielter Nachschulung (Typical Erroneous Pattern of Behavior of Learner Drivers and Possibilities of Selective Subsequent Behavior),
Zusammenfassende Darstellung, W. Bocher, G. Kroj, I. Pfafferott, and H. Sogemeyer. 1977, 341p
Text in German, abstract in English. Pub. in Unfall- und Sicherheitsforschung Strassenverkehr, heft 8, 1977.

A special analysis of official accident statistics and questionnaires served as a basis of the study. It was clear that drivers with up to 2 years driving experience were involved in accidents 2 to 3 times more often than drivers who held a driving license more than 6 years. The most important result was that drivers in the age group 25-55 who held a driving license less than 2 years, were not involved in substantially more accidents than drivers in the same age group who had more driving experience. The higher accident rate among younger drivers showed a specific tendency as well. The main reasons as determined by the police are: driving off the road and collisions with oncoming traffic in conjunction with excessive speed. Youthfulness and inexperience at the wheel were concluded to be significant factors in the connected attitudes and patterns of behavior.

PB80-198732 PC **A03**/MF **A01**
BioTechnology, Inc., Arlington, VA.
Pedestrian Accidents Occurring on Freeways: An Investigation of Causative Factors, Accident Data Collection and Analysis. Volume I. Executive Summary.
Final rept. Nov 74-Apr 76 on Phases 3 and 4,
R. L. Knoblauch, W. Moore, Jr., and P. R. Schmitz. Oct 78, 37p FHWA-RD-78-169
Contract DOT-HS-355-3-718
See also Volume 2, PB80-198740.
Also available in set of 3 reports PC E12, PB80-198724.

The objective of the study was to collect and analyze data on freeway pedestrian accidents. Data on 236 accidents involving pedestrians struck on limited access highways were collected. The data included behavioral sequence items, site characteristic items, identification items, pedestrian factors, driver factors and vehicle factors. The accident investigations were intended to identify the precipitating and predisposing factors in each accident. The data reduction and data analysis phase resulted in the identification of a number of characteristic accident situations or accident types. Although 14 different accident types were identified, the most frequent types accounted for nearly 60% of the accidents. Countermeasures intended to impact on each of the accident types are discussed.

PB80-198740 PC **A11**/MF **A01**
BioTechnology, Inc., Arlington, VA.
Pedestrian Accidents Occurring on Freeways: An Investigation of Causative Factors, Accident Data Collection and Analysis. Volume II. Final Report.
Final rept. Nov 74-Apr 76 on Phases 3 and 4,
R. L. Knoblauch, W. Moore, Jr., and P. R. Schmitz. Oct 78, 232p FHWA-RD-78-170
Contract DOT-HS-355-3-718
See also Volume 1, PB80-198732 and Volume 3, PB80-198757.
Also available in set of 3 reports PC E12, PB80-198724.

The report discusses the analysis of data collected on 236 accidents involving pedestrians struck on limited-access highways. Countermeasures intended to impact on each of the accident types are discussed.

PB80-198757 PC **A08**/MF **A01**
BioTechnology, Inc., Arlington, VA.
Pedestrian Accidents Occurring on Freeways: An Investigation of Causative Factors, Accident Data Collection and Analysis. Volume III. Appendixes.
Final rept. Nov 74-Apr 76 on Phases 3 and 4,
R. L. Knoblauch, W. Moore, Jr., and P. R. Schmitz. Oct 78, 160p FHWA-RD-78-171
Contract DOT-HS-355-3-718
See also Volume 2, PB80-198740.
Also available in set of 3 reports PC E12, PB80-198724.

The report discusses the analysis of data collected on 236 accidents involving pedestrians struck on limited-access highways. Countermeasures intended to impact on each of the accident types are discussed. The following appendixes are included: Single-field variable distributions; Data collection form; Field investigator coding manual; Abbreviated accident description; Operational forms; Glossary, and FHWA freeway pedestrian accident survey.

UCLA-12/1216 PC **A03**/MF **A01**
California Univ., Los Angeles. Dept. of Environmental Science and Engineering.
Worker Health and Safety in Solar Thermal Power Systems. VI. Solar Ponds.
A. Z. Ullman, B. B. Sokolow, and M. Broutman. Oct 79, 36p
Contract EY-76-C-03-0012

The design of solar pond electric power generation systems is reviewed to delineate factors which may affect worker health and safety. Materials handling problems are identified, including brine production and circulation hazards. Toxicity of microorganisms and of pond additives is considered, as well as salt intrusion and dispersal. Each appears to have a potential negative health effect. An effect of the water supply quality on worker health may arise from impurities in the water and from waste disposal. This is of major importance if agricultural runoff waters are used. Other hazards identified include fire and reduced visibility hazards. (ERA citation 05:022040)

13M. Structural Engineering

AD-A086 062/7 PC **A05**/MF **A01**
McDonnell Aircraft Co St Louis MO
Compression Fatigue Life Prediction Methodology for Composite Structures - Literature Survey.
Interim rept. Oct 79-Jan 80,
C. R. Saff. Jun 80, 77p NADC-78203-60
Contract N62269-79-C-0214

This report summarizes literature concerning static strength and fatigue analysis of bolted jointed in composite materials. The literature survey was a portion of the first Task of the Navy Contract N62269-79-C-0214, 'Compression Fatigue Life Prediction Methodology for Composite Structures'. The objective of this program is to develop a fatigue life prediction methodology that will improve design efficiency, facilitate structural certification and provide guidelines for service life management. This survey provides a basis for formulation of the experimental and analytical programs to be performed in later tasks. (Author)

AD-A086 210/2 PC **A22**/MF **A01**
Merritt Cases Inc Redlands CA
Continuation of Static Tests of Segments of Tunnel Linings. Volume II Data.
Final rept. 21 Nov 77-30 Jun 79,
H. C. Davis, K. B. Morrill, and J. L. Merritt. 30 Jun 79, 519p 78-004-T2-VOL-2, DNA-5000F-2, AD-E300 813
Contract DNA001-78-C-0037

Volume II presents the complete set of laboratory data obtained from a continuation series of 19 quasi-static tests of segments of cylindrical tunnel linings. Test specimens included scale models of a composite-integral structure and a steel structure with backpacking fielded in the MIGHT EPIC/DIABLO HAWK structures experiments and a corrugated structure with backpacking fielded in PILE DRIVER Event. Also included were two additional structural concepts: a steel fiber reinforced concrete model and a composite-integral model with backpacking. (Author)

AD-A086 212/8 PC **A05**/MF **A01**
Newmark (Nathan M) Consulting Engineering Services Urbana IL
Approximate Probabilistic Methods for Survivability/Vulnerability Analysis of Strategic Structures.
Final rept. 1 Jun 77-15 Jul 78,
A. H-S. Ang. 15 Jul 78, 97p DNA-4907F, AD-E300 819
Contract DNA001-77-C-0177

The major concepts and methods of probability and statistics that are of special significance to engineering are summarized, with emphasis on the potential applications in strategic structures problems. Approximations to well-established exact mathematical methods of probabilistic analysis were developed; these approximations are necessary for a sensible and effective implementation of the essential concepts in engineering, in the sense that they lead to simplifications that are consistent with the state and quality of available information, which (in practice) invariably must include subjective judgments. Applications in the development of probability-based relationships for the design of strategic structures were stressed; the required relationships can be developed so that the conventional (i.e. deterministic) methods of design may be retained. In particular, these may be in the form of safety factors that can be used in a conventional design format, in order to achieve a desired survivability in terms of a probability of survival. Similar relationships for target planning are also developed, and their significance identified and discussed. Several examples of strategic structural problems are developed to demonstrate the basic approach. (Author)

N80-26710/7 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Div. of Structures and Materials.
Application of Finite Element Methods to the Analysis of Cracks.
Final Report.
G. Bartelds. 1979, 53p NLR-TR-79118-U, ESA-CR(P)-1311
Contract ESA-3411/77-NL-PP(SC)

The applicability of finite element methods to the analysis of cracks was studied. Methods available for the calculation of elastic stress intensity data for cracks of arbitrary shape using finite element techniques were evaluated. The indirect energy release method using virtual crack front variation is found to be the more efficient while the direct displacement extrapolation method is identified as a valuable backup procedure. Special automatic program control lists were then generated for the ASKA package to perform elastic energy release rate calculations. The use of modified elements to improve accuracy is explained and well documented benchmark problems are provided. The preferred procedures identified were applied to three different structural configurations. Experimental verification was provided by means of constant amplitude fatigue tests and residual strength tests. A calibrated relationship between the fatigue crack growth rate and the stress intensity variation during each cycle was used to generate stress intensity data. A comparison between fatigue data and ASKA results shows a rather close agreement, but the residual strength data shows a poor correlation.

PB80-194301 PC **A10**/MF **A01**
California Inst. of Tech., Pasadena. Earthquake Engineering Research Lab.
Frequency Domain Identification of Structural Models from Earthquake Records.
Doctoral thesis,
Graeme Haynes McVerry. Oct 79, 224p EERL-79-02, NSF/RA-790437
Grant NSF-PFR77-23687

The usefulness of simple linear mathematical models for representing the behavior of tall buildings during earthquake response is investigated for a variety of structures over a range of motions including the onset of structural damage. The linear models which best reproduce the measured response of the structures are determined from the recorded earthquake motions. A systematic frequency domain identification technique is developed to determine the optimal models. The periods, dampings, and participation factors are estimated for dominant structural modes in the measured response. A method is developed to identify a single linear model appropriate for the entire response, or to approximate the nonlinear behavior exhibited by structures with a series of models optimal for different segments of the response. The study investigated earthquake records obtained from ten structures ranging in height from seven to forty-two stories. The maximum response amplitudes ranged from approximately 0.025g to 0.40g. Very small amplitude responses were reproduced well by linear models with fundamental periods similar to those measured in vibration tests. The close reproductions of measured motions confirm the accuracy of linear models with only a few modes for representing behavior during earthquake response of tall buildings in which no structural damage occurs.

PB80-194905 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.

The Effect of Moisture on the Thermal Conductance of Roofing Systems.
Final rept.,
Lawrence I. Knab, David R. Jenkins, and Robert G. Mathey. Apr 80, 58p NBS-BSS-123
Library of Congress catalog card no. 80-600031. Sponsored in part by Department of Energy, Washington, DC. Architectural and Engineering Systems Branch.

The results of laboratory tests are presented describing the effect of the moisture content on the thermal conductance of roofing systems containing insulation. Roofing systems, consisting of five types of rigid-board roof insulations with attached four-ply bituminous built-up membrane, were tested. Moisture was induced into the roofing system specimens by maintaining a constant water vapor pressure difference across them. Moisture gain in the insulation varied depending on the type and thickness of the insulation. A procedure was developed, using a heat-flow meter apparatus (ASTM C 518 type), to carry out thermal conductance tests on roofing specimens containing moisture. More than 200 tests were performed over a wide range of moisture contents. The approximate moisture distribution in the insulation was determined from core samples. Relationships between the thermal conductance and moisture content are presented. The relationships show that the presence of moisture in roofing systems can cause significant increases in the thermal conductance, depending on the type and thickness of the insulation.

PB80-196744 PC **A02**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Ambient and Forced Vibration Studies of a Multistory Triangular-Shaped Building. Proceedings of the American Society of Civil Engineers, Engineering Mechanics Division Specialty Conference Held at University of California at Los Angeles on March 30-31, 1976,
Roy M. Stephen, and Jakim Petrovski. Mar 76, 13p NSF/RA-760779
Grant NSF-AEN76-04263
Prepared in cooperation with Skopje Univ. (Yugoslavia). Inst. for Earthquake Engineering and Engineering Seismology.

The computer model formulations of structures have made available for study the elastic, and in certain structural systems, the inelastic response of structures when subjected to earthquakes. Dynamic field test data covering the complete dynamic characteristics of full-scale structures and providing natural frequencies, mode shapes, and damping values have been considered essential in the development of computer-model formulation techniques. To assess the feasibility of general purpose computer programs in predicting accurately the response of buildings with complex configurations and to accumulate a body of information on the dynamic properties of structures, a number of dynamic tests have been conducted on full-scale structures. The dynamic tests, using forced and ambient methods, which were performed during November, 1974 and March, 1975 on the Century City South-Theme Tower in Los Angeles, California, are reported in this paper. Because of the favorable advantages of the ambient vibration method in dynamic testing of full-scale structures, it was desirable to compare both methods in order to assess the accuracy of each method in evaluating the dynamic properties of the structural systems. Comparison of the forced and ambient vibration experiments demonstrate that it is possible to determine with adequate accuracy the natural frequencies and mode shapes of typical modern buildings using the ambient vibration method.

PB80-200736 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
Airtightness - Measurements and Measurement Methods,
Johnny Kronvall. 1980, 62p ISBN-91-540-3201-6, D8:1980

This paper describes different methods of measuring the airtightness of whole buildings, and reproduces the greater part of the results of measurements which have been made in different places, primarily using the pressure method but also using the tracer gas method to some extent. The pressure method is described together with the recommended method (SP 1977:1) published by the National Swedish Authority of Testing, Inspection and Meteorology, which is explained and commented upon where necessary. A number of variations of the tracer gas method, as used for measuring the ventilation in a building, whether continuously or occasionally, are described, together with descriptions of suitable equipment.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A085 862/1 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Tests on Pneumatically Powered Precision Force Generators.
Technical rept.,
R. D. Law. 18 Jan 79, 35p RAE-TR-79013, DRIC-BR-68395

An assessment has been made of the performance of two different types of pneumatic force generator, covering forces up to a 100 kN, with a view to their use in balance calibrations in the RAE 5m wind tunnel. This report describes tests performed on the force generators using a precision pneumatic control system firstly in conjunction with a static weigh beam test rig, followed by a series of tests to check the overall accuracy of performance against the 'dead-weight' Force Standard Machines at NPL Teddington. It has been shown that force generators using a rolling diaphragm seal can produce forces to an accuracy within 0.01% of maximum output assuming a linear calibration. Individual values of force output could be repeated to 0.003% of maximum output when checked against a simple weigh beam under fixed experimental conditions. (Author)

AD-A085 899/3 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Engineering (Selected Articles).
15 May 80, 38p Rept no. FTD-ID(RS)T-0663-80
Edited trans. of Elektrotekhnika (USSR) n10 p40-42, 45-48 Oct 69, by Robert Allen Potts.

No abstract available.

AD-A085 945/4 PC **A08**/MF **A01**
Army Missile Command Redstone Arsenal AL Ground Equipment and Missile Structures Directorate
Quantitative Nondestructive Evaluation.
Technical rept.,
Dallas G. Smith, and John A. Schaeffel, Jr. Oct 79, 174p Rept no. DRSMI/RL-TR-80-6

This manual has been prepared primarily for the non-NDE specialist. Its aim is to increase understanding of NDE capabilities among those involved in structural design and fracture mechanics calculations, and to provide physical details pertaining to most of the important NDE techniques. Since NDE has been so actively applied in the aerospace industry most of the application examples discussed are related to aerospace structures: however the basic ideas apply to any structure containing fracture critical components. The introduction discusses the relationship of fracture mechanics and quantitative NDE. The present practice of NDE, including military specifications, airplane inspection manuals, and inspector training are discussed next. The 'big five' methods of NDE -- liquid penetrant, magnetic particle, ultrasonic inspection, eddy current, and radiography -- are introduced as well as certain advanced inspection methods -- methods still undergoing development. The state-of-the-art, the sensitivity and reliability, of various methods along with the statistical analysis for determining flaw detection probability and confidence levels is presented. Excerpts from two actual airplane inspection manuals are included in the appendix to illustrate the degree to which instructions to inspectors are detailed and specified.

AD-A085 979/3 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
EXPOSURE. A Newsletter for Ocean Technologists. Volume 8, Number 2.
Technical rept.,
Roderick Mesecar. May 80, 9p
Contract N00014-79-C-0004

The Aanderaa Recording Current Meter (RCM) has been in extensive use at the Bedford Institute of Oceanography (BIO) for six years. From the beginning it was noted that large variations existed between successive compass calibrations of the same instrument. A program was initiated in 1975 to determine the causes of the compass errors and a number of them have been identified and measured. The nickel plating on the older style pressure cases can become magnetized and cause compass errors as high as 12 degrees peak-to-peak at the ambient geomagnetic field intensity at Dartmouth, N.S. (H = 17900 gamma). As reported by Hendry and Hartling (Exposure III(5)), under the influence of the compass's own magnetic field and high pressure, the plating can become sufficiently magnetized to lock the compass in a fixed orientation. It is recommended that at depths of less than 1500 meters the pressure cases should be carefully degaussed just prior to mooring. If the RCM is to be moored at greater depths or in the far north where the horizontal field intensity is weak, the new epoxy-coated pressure cases having nickel only in the upper 0-ring region should be used. (Author)

AD-A086 047/8 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Validation of Heat Flux for Standard Quartz Lamp Tester and Calibration of NCTRF's Heat Flux Transducer.
Final rept.,
J. R. Piergallini. 31 Mar 80, 17p Rept no. NADC-80078-60

The objective was to verify calibration data of the Standard Quartz Lamp Tester used in Military Specification MIL-C-29143 for testing of the 'Reflectivity after Abrasion' of aluminized fabrics for the Navy Clothing and Textile Research Facility (NCTRF). A reduced heat flux was recommended by the Aircraft Ground fire Suppression and Rescue Office in their report, 'Aircraft Firefighter's Protective Proximity Clothing' dated August 1975. The report concluded that the heat flux should be reduced to 1.9 cal/sq cm sec for specification testing of aluminized fabric in order to be in agreement with reported findings. The 1.9 cal/sq cm sec was found to be the average maximum heat flux from the side and in close proximity to a fuel fire. Verification by NAVAIRDEVCEN was required to certify that the changes to be recommended to the current specification were correct. (Author)

AD-A086 109/6 PC **A03**/MF **A01**
Naval Research Lab Washington DC
An Ion Beam Milliprobe for Materials Analysis.
Final rept.,
R. D. Willis, and A. R. Knudson. 21 Mar 80, 26p NRL-MR-4187, AD-E000 433

An ion beam 'milliprobe' has recently been constructed and tested in the Materials Modification and Analysis Branch and is now being applied to the microanalysis of materials. Singly charged ion beams from the NRL 5-MV Van de Graaff accelerator with energies up to 4 MeV can be utilized. A miniature electrostatic lens in line with a pinhole aperture focuses these ion beams to spot sizes as small as approximately 20 micrometers in diameter (0.8 mil, hence the name 'milliprobe'). The sample is positioned in the millibeam by means of a motorized X-Y translation stage which allows one to conduct computer-controlled two-dimension scans of the sample with one-micrometer steps. The milliprobe has been used in conjunction with conventional ion beam analysis techniques to characterize the near-surface regions of alloys and semiconductor materials when good lateral resolution is a requirement. The use of the milliprobe is briefly illustrated in two current studies: (1) wear reduction in stainless steels by the implantation of nitrogen and (2) surface composition changes induced by the laser annealing of silicon that has been implanted with nitrogen.

AD-A086 124/5 PC **A03**/MF **A01**
Harry Diamond Labs Adelphi MD
Laser System for the Detection of Flaws in Solids.
Technical rept.,
Ronald J. Wellman. May 80, 35p Rept no. HDL-TR-1902

An investigation of a laser flaw-detection system has been conducted. The technique replaces the piezoelectric transducers used in conventional flaw-detection systems with an optical system incorporating a pair of lasers. One laser generates a high-power pulse that strikes the test sample and generates a short-pulse acoustic wave in the sample. The second laser is used in an interferometer that monitors the surface motion. The advantages of this system over conventional techniques are its speed and flexibility. Since the system is remote--i.e., no physical contact is necessary--the sample could be optically scanned very rapidly. Also, there is no limitation on the size or shape of the test object as there might be with conventional methods. (Author)

AD-A086 254/0 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Interferometer Design and Data Handling in a High-Vibration Environment. Part II. Data Handling.
John H. Schummers. 1980, 5p Rept no. AFGL-TR-80-0080
Pub. in SPIE, v191 Multiplex and/or High-Throughput Spectroscopy, p92-95 1979. See also Part 1, AD-A085 531.

No abstract available.

AD-A086 262/3 PC **A02**/MF **A01**
National Bureau of Standards Boulder Co National Engineering Lab
Summary of Work on Cooled Ion Frequency Standard, Fiscal Year 1980.
Annual rept. Sep 79-Aug 80,
D. J. Wineland, and F. L. Walls. 15 Jun 80, 7p
Contract N00014-77-F-0046

The purpose of this work is to develop techniques to overcome the fundamental limits of present frequency standards--the second and residual first-order Doppler shifts. To this end we study suitable frequency reference transitions in ions which are stored on electromagnetic traps and cooled by radiation pressure to less than 1K.

AD-A086 263/1 PC **A03**/MF **A01**
California Univ Los Angeles Dept of Materials
Acoustic Emission Arising from Plastic Deformation and Fracture.
Technical rept.,
Kanji Ono. May 80, 42p Rept no. TR-80-02
Contract N00014-75-C-0419
Presented at the Joint Meeting of ASA and ASJ, special session on Acoustic Emission, Honolulu, HI, 1 Dec 78.

This paper reviews current status of acoustic emission signal detection methods, theoretical analysis of acoustic emission sources and acoustic emission behavior of materials arising from plastic deformation and fracture. Recent developments in quantitative signal detection and transducer characterization are considered. Several theories of acoustic emission sources are summarized and one based on dislocation theory by Malen and Bolin is extended to provide a relation between the inelastic displacement at a source to the peak voltage output of a resonant transducer. Models of acoustic emission from plastic deformation are presented. A new model for continuous acoustic emission is developed on the basis of the modified Malen-Bolin theory. Predictions of the model are discussed in conjunction with recent studies on acoustic emission behavior as a function of test temperature and of heat treatment. Finally, acoustic emission due to cracking is evaluated, especially in relation to amplitude distribution analysis of burst-type emission. (Author)

BDX-613-2375 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Semiautomated Inspection of Superfinished Spherical Surfaces.
P. E. Klingsporn. 1980, 9p CONF-800506-1
Contract EY-76-C-04-0613
North American manufacturing research conference, Rolla, MO, USA, 18 May 1980.

Lapping and polishing techniques are used at Bendix Kansas City to fabricate superfinished spherical metal surfaces. A laser-light reflection method has been developed for semiautomated inspection of the surfaces. The reflected and diffracted light intensity distributions from the spherical surface are measured with an array of photodetectors interfaced with a data sampler and a minicomputer programmed to distinguish between pits and scratches. For automated measurement, standard deviations for scratch width and depth are 3 and 0.3 mu m (120 and 12 mu in.), respectively, and for pit diameter and depth are 5.8 and 0.9 mu m (230 and 36 mu in.), respectively. A laser interferometric displacement measuring system interfaced with the computer is used for automated measurement of surface waviness. (ERA citation 05:024508)

CONF-791134-12 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Thermal Conductivity, Electrical Resistivity, and Seebeck Coefficient of SRM-735.
R. S. Graves, R. K. Williams, and J. P. Moore.
1979, 10p
Contract W-7405-ENG-26
16. international thermal conductivity conference, Chicago, IL, USA, 7 Nov 1979.

Two apparatus have been tested using an austenitic stainless steel thermal conductivity standard (SRM-735) from the National Bureau of Standards. The rho test results from the HTL were within +- 1.6% of the calibration curve from the NBS and this is within the +- 2% accuracy claimed by the NBS. The rho results from the HTL are in better agreement with the low temperature rho values from the NBS. The maximum deviation of any thermal conductivity value from the NBS values was - 3.2% at 470 exp 0 K. Since the HTL has been used successfully on so many materials including an ad hoc thermal conductivity standard, the good agreement of the NBS calibration results and the present HTL results is supportive of the standard values above 300 exp 0 K. The same statement cannot be made with regard to the HA results, but, at the very least, they do not disagree with the NBS values. (ERA citation 05:022860)

N80-26637/2 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Palo Alto, CA.
Soft X-Ray Polychromator for the Solar Maximum Mission.
Final Report.
C. W. Gilbreth, C. W. Acton, and C. J. Wolfson.
Apr 80, 37p NASA-CR-159994
Contract NAS5-23758

The design, fabrication, development tests, integration, and acceptance tests of the X-ray polychromator are reported. Spacecraft integration and test support, orbital operations preparations, and launch and post launch operations support tasks are discussed.

N80-26639/8 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Sunnyvale, CA.
Preliminary Design of the Cryogenic Cooled Limb Scanning Interferometer Radiometer (Clir), Phase 2.
Final Report.
20 Jan 78, 45p NASA-CR-159992, LMSC-D633472
Contract NAS5-25320

A cryogenic system to be utilized with a mounted pointing system is designed. The analysis indicates that the resulting design is significantly heavier than previous design due to the increased diameter of the system, resulting in greater tank and vacuum enclosure weights. Additional weight is also required in the area where the payload is attached to the pointing system in order to provide additional stiffness to the payload. The vacuum shell required to enclose the instrument is shorter and therefore an attendant reduction in instrument package weight would be expected. The primary resonance of the cooler instrument package occurs at 21 Hz, a mode in which the flexibility of the vacuum shell allows motion of the cryogen tank and instrument, and which can be increased by additional stiffening in the region of the pointing system vacuum shell connection at the cost of additional weight. The second resonance at 59 Hz is due to vibration of the helium tank on the fiberglass support tubes. The parasitic heat load can be reduced to 0.28 W by the utilization of a sandwich support tube structure in place of the monocoque structure assumed in the design.

N80-26640/6 PC **A02**/MF **A01**
Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
An Oscillatory Mass Flowmeter for Gas-Liquid Flows.
L. M. Druzhkova, V. G. Bulygin, V. E. Egorov, V. S. Nesterenko, and A. L. Lavrov-averin. 1980, 9p NRC/CNR-TT-1967, ISSN-0077-5606
Transl. Into English from Pribory I Sistemy Upravleniya (USSR), No. 11, 1972 p 22-24.

An oscillatory flowmeter (BMP-1) designed to measure the mass flow of gas liquid mixtures without the prior separation of the liquid was developed. The flowmeter consists of a BMP-1 sensing device and a decremeter. The sensing device includes a mechanical pendulum, an output sensor, and a driver unit. The electromagnets of the driver unit receive cyclic signals, when transmitting stops the pendulum freely oscillates in a transverse direction. The fluid whose flow rate is to be measured flows through the central passage of the pendulum, so as to dampen the pendulum oscillations. The coefficient of attenuation of the pendulum oscillations is proportional to the fluid mass flow G which is to be metered. A numerical evaluation of the effect of the structural dimensions of the sensing unit on its output performance is conducted.

N80-26642/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Development of a Feed Monitor System for a Helium-Cooled Michelson Intererometer for the Spacelab.
P. Essenwanger. Jun 80, 75p NASA-TM-76275, MPI-PAE/EXTRATERR-161
Contract NASW-3199
Transl. Into English of 'Entwicklung Eines Vorschubmessystems fuer Ein Helium-Gekuehltes Michelsoninferometer Auf Spacelab', Rept. Mpi-Pae/EXTRATERR161 , Max-Planck Inst. Fuer Phys. Und Astrophys., Inst. For Extraterrestrial Physics., Munich, Jan. 1980 p 1-85. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A Michelson interferometer feed monitor system developed for Spacelab is described. The device is helium cooled and is to be used to measure far infrared radiation sources in space. Performance data and development sequence are presented.

N80-26649/7 PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
Development and Calibration of a Total Temperature Probe for the Imperial College Aeronautics Department Gun Tunnel.
R. P. Bartlett, A. J. Edwards, and R. Hillier. Jun 79, 32p IC-AERO-79-02
Contract AT/2037/084

Development of a vented-shield thermocouple probe for total temperature measurements in a hypersonic turbulent boundary layer concentrated on maximizing both the transient response rates and the steady state recovery factor (which eventually reached about 98% at the highest test Reynolds numbers) is described. This performance was achieved by maximizing the unit Reynolds number within the shield and hence the convective heating of the sensor; and by improving the sensor aspect ratio parameters which control the conduction losses. The probe was operated with an unheated shield. It is argued that shielding a probe affords aerodynamic and response advantages compared with its unshielded counterpart. Performance deteriorates with reduction in Reynolds number and hence with immersion in the boundary layer. The critical limit in a short duration facility must always be failure to reach a steady state. Probes were calibrated against Reynolds number for the required range but at fixed total temperature. It is expected that the worst error in steady state temperature for a given probe would be of order 40 K with a considerable improvement in overall accuracy for profile data averaged from several probes.

N80-26681/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
Rapid Data Comparison Technique Development for N-Ray/X-Ray Analysis.
Final Report.
R. L. Butterfield. Oct 79, 9p NASA-TM-81089, KSC-TR-60-1

An operational N-ray/X-ray computer analysis system for nondestructive testing problems was realized by developing: (1) more efficient data transfer routines for use in existing image processing systems; (2) the capability to store and analyze multiple N-ray/X-ray images; (3) an efficient 2-D Fast Fourier Transform; and (4) transfer functions compensation capability to correct for distortions and nonlinearities of N-rays/X-rays. Applications of the technique are summarized for the following: thermal protection system tile with hydraulic fluid; thermal protection system tile with corrosion; thermal protection system tile debonding; stainless steel tubing corrosion; defective electrical devices; fast film restoration and deblur; corrosion tracking over time; reduction of source vignetting, and identification of materials (0 rings, Teflon parts, soft goods) via table look up.

N80-26682/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Quantitative Ultrasonic Evaluation of Engineering Properties in Metals, Composites and Ceramics.
A. Vary. 1980, 18p NASA-TM-81530, E-482
Presented at First Seminar on Advanced Ultrasonic Tech., Longueuil, Quebec, 9-10 Jun. 1980; Sponsored by National Research Council of Canada.

Ultrasonic technology from the perspective of nondestructive evaluation approaches to material strength prediction and property verification is reviewed. Emergent advanced technology involving quantitative ultrasonic techniques for materials characterization is described. Ultrasonic methods are particularly useful in this area because they involve mechanical elastic waves that are strongly modulated by the same morphological factors that govern mechanical strength and dynamic failure processes. It is emphasized that the technology is in its infancy and that much effort is still required before all the available techniques can be transferred from laboratory to industrial environments.

PAT-APPL-6-149 793 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Stable Ultraviolet Bandpass Chemical Filter.
Patent Application,
L. R. Kelley. Filed 14 May 80, 16p AD-D007 364/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a liquid chemical filter for suppressing the heat producing portion of the solar spectrum emanating from a simulated solar source and composed of a mixture of hydrochloric acid, cobalt sulfate and distilled water positioned between two ultraviolet transmitting fused silica windows. (Author)

PAT-APPL-6-150 381 PC **A02**/MF **A01**
Department of the Navy Washington DC
Closed Torque Test Machine.
Patent Application,
Ronald D. Moore. Filed 16 May 80, 17p AD-D007 312/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses an apparatus for testing mating splined parts under rotational torsional loading at selectively variable axial misalignments. The apparatus is in the form of what is commonly known as a four-square test machine to which a locked-in static torque is applied to simulate actual loading on splined connector parts during rotation. (Author)

PAT-APPL-6-152 232 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Interferometric Distance Measurement Method.
Patent Application,
Thomas A. Nussmeier. Filed 22 May 80, 16p AD-D007 362/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of Application Available NTIS.

An interferometric distance measurement method is disclosed which utilizes a sequence of at least two closely spaced optical wavelengths in order to achieve ambiguity resolution during the measurement procedure. In so doing, this method performs the equivalent of measuring distances at a relatively long wavelength by measuring the phase difference at two closely spaced optical wavelengths and computing the effective phase measurement at a wavelength which corresponds to the frequency difference between the two optical wavelengths measured. (Author)

PAT-APPL-6-153 473 PC **A02**/MF **A01**
Department of the Navy Washington DC
Precision Laser Pulse Radiometer.
Patent Application,
Jack R. White, Charles L. Godwin, and Raymond J. Blattel. Filed 27 May 80, 22p AD-D007 305/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses an apparatus for automatically detecting and measuring the energy of laser pulses over a wide range of energy levels and in the presence of high ambient light levels. The current produced by a laser pulse striking a photoconductive detector is integrated by a capacitor to obtain a voltage across the capacitor which is proportional to the total energy incident of the detector during the pulse. The total energy of the pulse is then determined by measuring the time from when the capacitor voltage crosses a reference level during current integration to the time when the capacitor voltage, discharging through a resistor recrosses the reference voltage. The leading edge of the capacitor charging voltage is used to couple a high frequency oscillator to the input of a counter. The oscillator is then decoupled from the counter when the voltage of the discharging capacitor crosses a reference level. The count in the counter is transferred to a shift register for transmission to a data processing device. The effects of the ambient light are automatically compensated for with an interrupted feedback loop in which the loop is opened when a laser pulse is detected and the feedback held at the prepulse level for the duration of the RC discharge time. (Author)

PAT-APPL-6-154 726 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Stark Effect Spectrophone for Continuous Absorption Spectra Monitoring.
Patent Application,
M. J. Kavaya. Filed 30 May 80, 16p N80-25538/3, NASA-CASE-NPO-15102-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A Stark effect spectrophone is provided with a pulsed or continuous wave laser for monitoring the constituents of an unknown gas. The laser beam is directed through windows of a closed cell while the unknown gas to be monitored is caused to flow continuously through the cell between electric field plates disposed in the cell on opposite sides of the beam path through the cell. The plates are so disposed as to be divergent, e.g., flat plates at an oblique angle relative to each other, or plates shaped according to a mathematical function, so that with constant voltage applied across the plates there is a variation in electric field strength along the beam path. Discrete energy absorption sensors are positioned at field strength points of interest. When a beam is passed through the cell, energy absorbed by the gas then present in the cell will increase gas pressure and temperature at each point along the beam path according to the spectral lines of the constituents of the gas for the particular field strengths at those points. This increase is sensed at each point simultaneously while modulating the absorption of the beams energy by the gas sample in the cell.

PAT-APPL-6-157 925 PC **A02**/MF **A01**
Department of the Navy Washington DC
Micro-Power Magnetometer.
Patent Application,
Robert E. Brown. Filed 6 Jun 80, 17p AD-D007 301/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a micro-power magnetometer which can be driven by an oscillator with low power expenditure on the order of 50 to 150 microwatts. The low power feature is provided for by using an oscillator circuit with appropriate resistance which lengthens the base current pulse initiated by turn on thus decreasing the repetition rate, duty cycle and total on time. The drive and control windings are wound on a magnetic core. The drive winding is coupled to the collector of a transistor and the control winding is coupled to the base of the transistor. Detection of an ambient magnetic field is done with additional windings on the core which are connected to a balanced pulse-average difference detector. The magnetometer has a dynamic range which is very linear and large in comparison to the earth's magnetic field. (Author)

PAT-APPL-6-158 183 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Frequency Tracked Pulse Technique for Ultrasonic Analysis.
Patent Application,
J. H. Cantrell, and J. S. Heyman. Filed 10 Jun 80, 21p N80-26571/3, NASA-CASE-LAR-12697-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A tracking generator is slaved to a spectrum analyzer to produce an input signal having a frequency that follows the frequency of the spectrum analyzer sweeping local oscillator. The input signal is gated to a transducer by a transmitter gate to produce ultrasonic waves in the sample. The resulting ultrasonic echoes are converted into electrical signals by the transducer and then gated into the spectrum analyzer by receiver gate. This arrangement produces spectra that are equivalent to shock-exciting the transducer with a true delta function shock-excitation.

PATENT-4 164 373
Not available NTIS
Department of Energy, Washington, DC.
Spectrometer Employing Optical Fiber Time Delays for Frequency Resolution.
Patent,
J. J. Schuss, and L. C. Johnson. Filed 12 Jan 78, patented 14 Aug 79, 12p PAT-APPL-868 952
Supersedes PAT-APPL-868 952-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention provides different length glass fibers for a broad range of optical time delays for short incident chromatic light pulses for the selective spatial and frequency analysis of the light with a single light detector. The frequencies of the incident light are orientated and matched with the different length fibers by dispersing the separate frequencies in space according to the respective fiber locations and lengths at the input terminal of the glass fibers. This makes the different length fibers useful in the field of plasma physics. To this end the short light pulses can be scattered by a plasma and then passed through the fibers for analyzing and diagnosing the plasma while it varies rapidly with time. (ERA citation 05:026276)

PATENT-4 185 497
Not available NTIS
Department of the Navy Washington DC
Adiabatic Laser Calorimeter.
Patent,
Donald L. Decker, and Paul A. Temple. Filed 2 Oct 78, patented 29 Jan 80, 7p AD-D007 331/2, PAT-APPL-947 379
Supersedes PAT-APPL-947 379-78, AD-D005 468.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for for-

eign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device for measuring energy absorptance of a sample material is disclosed. A temperature controlled enclosure, in which a sample is suspended, is placed in an evacuated container. Calibration is accomplished by means of a known power dissipation in the sample. The sample material is irradiated by an energy beam of known power and a temperature rise is compared to the calibration temperature rise. Means for scanning the sample is also provided. (Author)

PATENT-4 205 229

Not available NTIS

National Aeronautics and Space Administration. Pasadena Office, CA.
Cooled Echelle Grating Spectrometer.
Patent,
R. Beer. Filed 31 Oct 78, patented 27 May 80, 6p N80-26635/6, PAT-APPL-956 529
Continuation of Abandoned US Patent Appl. Sn-646333, Filed 2 Jan. 1976 Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A cooled echelle grating spectrometer for detecting wavelengths between one micron and fifteen microns is disclosed. More specifically, the spectrometer has a cross-dispersing grating for ordering infrared energy and an echelle grating for further ordering of the infrared energy. Ordered radiation from the echelle grating is sensed by a detecting means. Also disclosed is use of a Schmidt camera for focusing the further ordered radiation from the echelle grating onto a detector array having individual detectors dispersed on a plane which substantially corresponds to a curved focal plane of the Schmidt camera. A spectrometer constructed according to the teachings of the present invention will continuously cover the spectrum between one micron and fifteen microns and have a resolution of 0.1/cm.

PATENT-4 205 428

Not available NTIS

Department of the Air Force Washington DC
Planar Liquid Crystal Matrix Array Chip.
Patent,
Michael N. Ernstoff, and Gordon F. Anderson. Filed 23 Feb 78, patented 3 Jun 80, 4p AD-D007 367/6, PAT-APPL-880 812
Supersedes PAT-APPL-880 812-78, AD-D004 806.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process for forming planar liquid crystal matrix array chips is disclosed including the steps of electroplating a conductive material over a smoothing layer thereby filling the contact holes with conductive material or alternatively placing a photoresist over the micro circuit, electroplating over the photo resist, which is then dissolved leaving conductive posts. The smoothing material is applied around the posts and the surface then polished, made flat and reflecting electrodes attached. (Author)

PATENT-4 207 520

Not available NTIS

Department of the Air Force Washington DC
Multiple Frequency Digital Eddy Current Inspection System.
Patent,
John H. Flora, and Henry T. Gruber. Filed 6 Apr 78, patented 10 Jun 80, 5p AD-D007 372/6, PAT-APPL-893 869
Supersedes PAT-APPL-893 869-78, AD-D004 952.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses an apparatus for inspecting for cracks under installed fasteners and the like using a multiple frequency digital eddy current system. A computer with a plurality of digital arrays generate drive signals which are converted to analog and applied to the test coil, a second set of digital arrays generate balance signals, are adjusted in amplitude and phase and drive signals so that the output of the test coil is zero in a test specimen, output signals from a work piece are processed in the computer giving phase-sensitive crack detection. (Author)

PATENT-4 207 594

Not available NTIS

Department of the Air Force Washington DC
Electronic Indirect Measuring System.
Patent,
John R. Morris, and Robert L. Grant. Filed 21 Jul 77, patented 10 Jun 80, 5p AD-D007 378/3, PAT-APPL-817 641
Supersedes PAT-APPL-817 641-77, AD-D004 298.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system and method of using a bore scope with an attached video system, the true field of view is measured, cross hair lines are generated on the video monitor and measured for extremes of field and again bracketing the object, a ratio is formed and is used as a multiplier of the true field of view. The results is the actual dimension of the object. (Author)

PATENT-4 208 129

Not available NTIS

Department of the Air Force Washington DC
Sensitive Laser Spectroscopy Measurement System.
Patent,
Donald J. Spencer. Filed 30 Jun 78, patented 17 Jun 80, 5p AD-D007 379/1, PAT-APPL-921 137
Supersedes PAT-APPL-921 137-78, AD-D005 569.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A sensitive laser spectroscopy measurement system having a laser radiation source and a dual beam and detection scheme that allows for the measurement of small intensity differences between a probe beam and a reference beam resulting from the absorption, gain or scattering of the probe beam by a medium placed in its optical path. The system attains measurement sensitivity of less than 10 to the minus 4th power when the laser radiation source for the probe and reference beam is modulatable. Further included within the system is a prism placed in the optical path of the laser beam before the beam splits into the probe and reference beams and a detector for each beam. The detectors are electrically connected to a sensitivity differential amplifier and an oscilloscope for displaying the intensities of the beams. (Author)

PB80-197346 PC **A04**/MF **A01**

Southwest Research Inst., San Antonio, TX.
A Study to Improve EPA Methods 15 and 16 for Reduced Sulfur Compounds.
Final rept.,
Henry F. Hamil, and Nollie F. Swynnerton. Apr 80, 63p EPA-600/4-80-023
Contract EPA-68-02-2489

EPA source test methods for reduced sulfur compounds, Method 15 for Claus sulfur recovery plants and Method 16 for Kraft pulp mills have been evaluated, and information is provided for the user. Techniques and procedures for the gas chromatographic measurement of hydrogen sulfide, carbonoxysulfide, carbon disulfide, methylmercaptan, dimethylsulfide and dimethyldisulfide were studied. Absorption of these species on the surfaces of the chromatographic system was found to be the main source of imprecision and inaccuracy in the analysis. Permeation devices containing the above sulfur compounds were found to permeate at uniform rates after one year of use. Aluminum cylinders containing compressed gas mixtures of the compounds under investigation were analyzed for four months. Results showed them to be stable in some instances and to be promising candidates for quality assurance materials. Comparison of an electrolytic conductivity detector with a flame photometric detector showed the former to be valuable for the analysis of reduced sulfur compounds under laboratory conditions.

PB80-197486 PC **A06**/MF **A01**

National Bureau of Standards, Washington, DC. National Measurement Lab.
Standard Reference Materials: Metal-On-Quartz Filters as a Standard Reference Material for Spectrophotometry - SRM 2031.
Final rept.,
R. Mavrodineanu, and J. R. Baldwin. Apr 80, 120p NBS-SP-260-68
Library of Congress catalog card no. 79-600192.
See also report dated Apr 79, PB-294 666.

This publication describes in detail the selection, production, testing, and certification of the semitransparent evaporated metal-on-fused silica filters as a Standard Reference Material for spectrophotometry. Particular attention is given to various factors that can affect the accuracy of the transmittance values established for these filters, such as: reflections, polarization, angle of incidence, and stability in time. Adequate procedures were devised and are described for the protection of the exposed metal layer surface using optical contact, and for the protection of the filter aggregate, by the use of metal holders provided with shutters and of metal storage containers. The data from several interlaboratory tests are also discussed, together with the results obtained on transmittance measurements on 19 sets of chromium-on-fused silica filters, protected by optical contact, which were studied over a period of two years. An Appendix contains the reproduction of several publications relevant to the subject discussed in this work.

PB80-200132 PC **A02**/MF **A01**

National Bureau of Standards, Washington, DC. National Engineering Lab.
The NBS Gage Block Calibration Process Using a Measurement Assurance Program.
Clyde D. Tucker. Jun 80, 10p NBSIR-80-2078

The calibration method for gage blocks, employing a measurement assurance program, is described for the user of an NBS calibration report. The various parameters and their significance to the calibration process are discussed.

PB80-808660 PC **N01**/MF **N01**

New England Research Application Center, Storrs, CT.
Bolometers. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 109p
Sponsored in part by National Technical Information Service, Springfield, VA.

The uses of bolometer detectors in many areas of physics and engineering are described. Some of these are in astro physics, particle accelerators, lasers, microwaves, infrared, fusion generators, night vision, thermal mapping and military systems. Spectral regions covered range from visible light through infrared, thermal, phonon, millimeter - wave, microwave and high frequency radio - wave domains. (Contains 105 citations)

PB80-808678 PC **N01**/MF **N01**

New England Research Application Center, Storrs, CT.
Bolometers. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 99p
Sponsored in part by National Technical Information Service, Springfield, VA.

The uses of bolometer detectors in many areas of physics and engineering are described. Some of these are in astro physics, particle accelerators, lasers, microwaves, infrared, fusion generators, night vision, thermal mapping and military systems. Spectral regions covered range from visible light through infrared, thermal, phonon, millimeter - wave, microwave and high frequency radio - wave domains. (Contains 91 citations)

PB80-808686 PC **N01**/MF **N01**

New England Research Application Center, Storrs, CT.
Bolometers. 1974-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Apr 80,

C. Gilbert Young. May 80, 162p
Sponsored in part by National Technical Information Service, Springfield, VA.

The uses of Bolometer detectors in many areas of physics and engineering are described. Some of these are in astro physics, particle accelerators, lasers, microwaves, infrared, fusion generators, night vision, thermal mapping and military systems. Spectral regions covered range from visible light through infrared, thermal mapping and military systems. Spectral regions covered range from visible light through infrared, thermal, phonon, millimeter - wave, microwave and high frequency radio - wave domains. (Contains 163 citations)

UCRL-52532(V.4)(Pt.4) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Automation of Continuous-Flow Analyzers for Trace Constituents in Water. Volume 4. Description of Program Segments. Part 4. TAACAL.
R. W. Crawford. 2 Nov 79, 62p
Contract W-7405-ENG-48

TAACAL, one of a series of computer programs necessary in automating the Technicon AutoAnalyzer is described. TAACAL measures the calibration standards and sets up the calibration curve. A flow chart and sequence list that describes and illustrates each logical group of coding, and a description of the contents and functions of each section and subroutine in the program is included. In addition, all arrays, strings, and variables are listed and defined, and a program listing with a complete list of symbols and references is provided. (ERA citation 05:022861)

14C. Recording Devices

PAT-APPL-6-153 114 PC **A02**/MF **A01**
Department of the Navy Washington DC
Developer for Dry Silver Paper.
Patent Application,
William H. Miller. Filed 27 May 80, 9p AD-D007 309/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a thermal processing device for dry photographic paper using a minimum amount of electrical energy. A cylindrical drum is provided with heating elements on the inside surface and current is applied through a slip ring assembly. A non-metallic belt, substantially equal in width to the length of the cylindrical drum, is supported by rollers so that a portion of the belt engages the cylindrical drum. Rotation of the cylindrical drum causes rotation of the belt and a sheet of paper fed into the device is sandwiched between the belt and drum and is heated thereby to develop the dry photographic paper.

14E. Reprography

AD-A086 070/0 PC **A04**/MF **A01**
ESL Inc Sunnyvale CA
Image Transformation Study.
Semi-annual technical Rept. 1 Oct 79-30 Apr 80,
Robert Devich, F. Weinhaus, L. Martin, D. Collier, and G. Kiremidjian. 30 May 80, 75p Rept no. ESL-PR339
Contract MDA903-80-C-0108, ARPA Order-3854

The purpose of the Image Transformation Study is to develop techniques for converting oblique aerial photography to the ground-level viewing perspectives that would be seen by an observer as he moves around within the imaged area. This report documents the first six months of the investigation.

AD-A086 265/6 PC **A11**/MF **A01**
Harris Corp Melbourne FL Government Communication Systems Div
Wideband Holographic Digital Recording and Reproduction. Phase IV.
Final technical rept. 28 Sep 78-15 Jun 79,
L. M. Ralston, and C. A. Shuman. Feb 80, 244p
RADC-TR-80-15
Contract F30602-78-C-0344

This study effort evaluates potential improvements to the performance of the Wideband Recorder (WBR) system. These potential improvements are in the areas of bit error rate (BER), data packing density, and system optical power efficiency. Improvements to corrected BER which can be obtained by deeper interleaving of the recorded codewords are described and data from experiments simulating this process are documented. A potential data packing density increase from a modification of the intensity profile of the recording beam is described and experimental results are presented. A reduction in raw BER which can be obtained by reduced data crosstalk is predicted, and the results of testing a new, low-crosstalk Acousto-Optic Page Composer (multichannel optical modulator) are presented. Finally a modification to the system's optical path which can reduce the optical power required for data recording is discussed. (Author)

PAT-APPL-6-147 417 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Dynamic Binary Fourier Filtered Imaging System.
Patent Application,
Harry L. Task. Filed 6 May 80, 14p AD-D007 360/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus for altering the spatial frequency content of recorded patterns by selectively filtering the patterns after they are transformed into the fourier domain is disclosed. The filter characteristics are spatially and temporally variable while the real space image of the altered pattern is being observed. A laser beam is projected through a transparency containing the pattern. The patterned beam, with diffraction interference effects, is transformed to the fourier domain at the surface of a liquid crystal light valve responsive to a spatially and temporally varying light projector. The projector activated regions reflects areas of the fourier domain beam, while other areas are absorbed or incoherently reflected. A beam splitter redirects a portion of the reflected beam to a continuously observable image plane after transformation back into real space. (Author)

15. MILITARY SCIENCES

15C. Defense

AD-A085 966/0 PC **A05**/MF **A01**
General Accounting Office Washington DC Procurement and Systems Acquisition Div
Issues Identified in 21 Recently Published Major Weapon System Reports.
12 Jun 80, 92p Rept no. GAO/PSAD-80-43

This report summarizes 21 major weapon system reports we issued during January and February 1980. The purpose is to focus attention on the principal issues found to be common among several weapon programs. The report also serves as a quick reference to all our major acquisition work during the past 12 months. The majority of issues affecting the weapon systems' mission effectiveness are concerned with operational or performance limitations, survivability or vulnerability, availability, requirements, and reliability.

AD-A086 017/1 PC **A05**/MF **A01**
Air Univ Library Maxwell AFB AL
The Chinese Tactical Air Forces and Strategic Weapons Program: Development, Doctrine, and Strategy.
Research study,
Paul H. B. Godwin. Apr 78, 93p AU-201-78-AUL, FAR-28907

The purpose of this analysis is to prevent a description and analysis of the growth of the People's Liberation Army Air Force, the Chinese nuclear weapons program and the associated doctrinal and strategic thought. It is designed to bring together the results of considerable research (mostly completed by analysts other than this author) into a single essay to serve the interests of the students attending the various schools associated with the Air University. A second purpose of this essay is to review the current debate over the modernization of the Chinese armed forces within a specific focus on the People's Liberation Army Air Force and the strategic weapons program.

AD-A086 048/6 PC **A05**/MF **A01**
Department of Defense Washington DC
The National Military Command Structure,
Richard C. Steadman. Jul 78, 84p

In September 1977, President Carter requested that the Secretary of Defense initiate a searching organizational review of the National Military Command Structure (NMCS). He requested an unconstrained examination of alternatives for making it more effective and efficient in carrying out the national security mission. This Report presents and evaluates alternatives responsive to the President's instructions. What emerged from the discussions and studies was a consensus that, by and large, the system has been generally adequate to meet our national security needs in peacetime, crisis, and wartime. We did find, however, a general perception of some fundamental shortcomings which may make it incapable of dealing adequately with our future needs. The present National Military Command Structure was created by the National Security Act of 1947, as amended. It has evolved, through a series of amendments up to 1958, from a decentralized National Military Establishment of separate Military Departments to today's Department of Defense (DoD) headed by a Secretary of Defense with full authority and responsibility for its operation.

AD-A086 053/6 PC **A07**/MF **A01**
Department of Defense Washington DC
Report to the Secretary of Defense of the Defense Agency Review,
Theodore Antonelli. Mar 79, 135p

This report responds to the request to conduct an exploratory review of Defense Agencies with a view toward identifying organizational problems, if any, and developing options for further study. It is based on data furnished by the Agencies and more than 200 interviews with key Department of Defense (DoD) officials and other knowledgeable people. The findings and issues have been confirmed by field research.

15E. Logistics

AD-A086 036/1 MF **A01**
Center for Naval Analyses Alexandria VA Inst of Naval Studies
An Analysis of Commercial Commodity Acquisition.
Research contribution,
Bruce N. Angier, Thomas B. White, and Stanley A. Horowitz. Dec 79, 115p Rept no. CRC-418
Contract N00014-79-C-0104
Availability: Microfiche copies only.

The purpose of this study is to determine whether there are potential cost savings available to the military through increased purchase of commercial, as opposed to designed-to-specification, equipment and material. This study differs from previous work in that it tries to develop low-cost, survey information on potential savings, and it is designed to be preliminary to a field test of candidate equipment. The equipment studied is that assigned to and used by a Marine 105mm howitzer battery. The method used to gather the commercial cost estimates was to survey commercial manufacturers to obtain cost data on possible substitutes. This method uncovered several items with significant cost-saving potential. (Author)

AD-A086 060/1 PC **A04**/MF **A01**
Caci Inc-Federal Arlington VA
Aviation Component Repair Program Analysis. Volume I.
Final rept.
Mar 80, 65p
Contract N00014-80-C-0097
See also Volume 2, AD-C021 236.

Depot repair of aviation repairable components supports the flight operations of the U.S. Navy and Naval Reserve Aircraft. In order to determine an

appropriate measure of effectiveness which could be used to assess the impact of the component repair program, several statistical analyses were performed comparing financial and other data related to the Aviation Component Repair Program, data in aviation related programs and various effectiveness measures. (Author)

AD-A086 063/5 PC **A05**/MF **A01**
PRC Information Sciences Co Bala Cynwyd PA
Study of an Accreditation Policy for Navy Embedded Computers,
R. Edgerton, and B. Rudwick. Apr 80, 93p Rept no. PRC-R2518
Contract N00014-79-C-0862

This report presents the analysis and conclusions of PRC/ISC's study of the Navy's proposal for a policy for accreditation for embedded computers. The concept of accreditation, as advanced by the Navy, can be summarized as the reliance on the availability of competing computers in each of various performance ranges. These computers would then provide each Program Manager with competing alternatives that could be used in designing a system with a resultant reduction in the total life cycle costs for the system. The Accreditation Policy is viewed as an effort to relieve some of the problems currently experienced by the Navy in the acquisition, use and support of embedded computers.

AD-A086 205/2 MF **A01**
Office of Naval Research Arlington VA
Naval Research Logistics Quarterly. Volume 27, Number 2.
Jun 80, 348p
See also Volume 27, Number 1, AD-A083 423.
Availability: superintendent of Documents GPO, Washington, DC 20402 HC$11.95 Microfiche furnished to DTIC (and NTIS) users.

Contents: A Single Period Model for a Multiproduct Perishable Inventory System with Economic Substitution, Nonlinear One-Parametric Linear Programming and T-Norm Transportation Problems, Optimal Location of a Facility Relative to Area Demands, The Random Order Service G/M/m Queue, Some Results of the Queueing System E/M/c, An Approximation for the Waiting Time Distribution in Single Server Queues, Congestion Tolls: Equilibrium and Optimality, Computing Equilibria Via Nonconvex Programming, Stochastic Linear Programs with Simple Recourse: The Equivalent Deterministic Convex Program for the Normal, Exponential, and Erlang Cases, Partially Controlled Demand and Inventory Control: An Additive Model, A Dynamic Inventory System with Recycling, Sensitivity Analysis as a Means of Reducing the Dimensionality of a Certain Class of Transportation Problems, On a Search for A Moving Target, Analysis of Data from Life-Test Experiments Under an Exponential Model, and Estimating the Economic Impact of the 1973 Navy Base Closing: Models, Tests, and an Ex Post Evaluation of the Forecasting Performance.

15F. Nuclear Warfare

AD-A085 813/4 PC **A11**/MF **A01**
Command and Control Technical Center Washington DC
The CCTC Quick-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume I. Data Management Subsystem. Change 3.
22 May 80, 238p Rept no. CCTC-CSM-MM-9-77-VOL-1-3
Change 3 to Volume 1, Part 1, AD-A054 377 and Volume 1, Part 2, AD-A054 310. See also Change 2, AD-A072 871.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, provide statistical output summaries, and produce input tapes to simulator subsystems external to QUICK.

AD-A085 814/2 PC **A05**/MF **A01**
Command and Control Technical Center Washington DC
The CCTC Quick-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume II. Weapon/Target Identification Subsystem. Change 3.
30 Apr 80, 100p Rept no. CCTC-CSM-MM-9-77-VOL-2-3
Change 3 to Volume 2, AD-A050 081.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, provide output summaries, and produce tapes to simulator subsystems external to QUICK. QUICK has been programmed in FORTRAN for use on the CCTC HIS 6000 computer system. The QUICK Maintenance Manual consists of four volumes: Volume I, Data Management Subsystem; Volume II, Weapon/Target Identification Subsystem; Volume III, Weapon Allocation Subsystem, Volume IV, Sortie Generation Subsystem. The Maintenance Manual complements the other QUICK Computer System Manuals to facilitate application of the war gaming system. This volume, Volume I, in two parts, provides the programmer/analyst with a technical description of the purpose, functions, general procedures, and programming techniques applicable to the modules (programs) and subroutines of the Data Management subsystem.

AD-A086 160/9 PC **A05**/MF **A01**
Computer Sciences Corp Falls Church VA
The CCTC Quick-Reacting General War Gaming System. (QUICK). Users Manual. Volume I. Data Management Subsystem. Change 3,
Dale J. Sanders, Paul F. M. Maykrantz, Jim M. Herrin, and Edward F. Bersson. Apr 80, 98p
CCTC-CSM-UM-9-77-VOL-1-3
Contract DCA100-78-C-0042
Change 3 to AD-A047 256. Prepared in cooperation with System Sciences, Inc., Bethesda, MD under contract DCA100-75-C-0019.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, provide output summaries, and produce tapes to simulator subsystems external to QUICK. QUICK has been programmed in FORTRAN for use on the CCTC HIS 6080 computer system. The Users Manual complements the other QUICK Computer System Manuals to facilitate application of the war gaming system. This volume, Volume I, provides instructions for using the Data Management Subsystem. It is intended for the CCTC user/analyst who is concerned with preparing the data base for a war game, selecting optional features of QUICK, designating control parameters, submitting computer jobs, and analyzing computer output.

PB80-197080 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Psychological Deterrents to Nuclear Theft: An Updated Literature Review and Bibliography,
George W. Lapinsky, Jr., and Clare Goodman. May 80, 47p NBSIR-80-2038
See also report dated Mar 76, PB-252 021.

A review of the unclassified literature dealing with psychological deterrents was conducted for the Defense Nuclear Agency (DNA). The review indicates that while human psychological processes (sensory, perceptual, and cognitive) can be manipulated by various means, definitive empirical data are lacking which directly relate to deterring nuclear weapon theft. Behavioral impact research should be undertaken by DNA to ascertain the deterrence values of the many techniques identified.

15G. Operations, Strategy, and Tactics

AD-A086 016/3 PC **A11**/MF **A01**
Academic Services Group (3825th) (Au) Maxwell AFB AL
Soviet Air Power, 1917-1976.
Research study,
Kenneth R. Whiting. Aug 76, 245p AU-202-76-3825ASG, FAR-25500

This study is an attempt to describe in a short format how the Soviets built an Air Force and how they used it over the last six decades. It is not a work based on scholarly research in original sources, but rather a tale derived from the research of others. The story should be of interest to American military personnel since it concerns the infancy, adolescence, and present maturity of the Soviet Air Forces (VVS), now one of the two most powerful Air Forces in the world--and it seems as if the VVS is not averse to becomming number one. When the Bolsheviks came to power in November 1917, they inherited a higgledy-piggledy Tsarist Air Force made up of obsolescent foreign-type aircraft, either imported or manufactured in Russia under license. The one exception was Sikorsky's 'Il'ya Muromets,' the largest bomber and only successful four-engine plane of that time. Air power was a negligible factor in the Civil War between the Reds and the Whites (1918-21) as aircraft were scarce, the little fuel available was unbelievably awful, and the combat threaters were enormous. Airplanes did, however, play havoc with cavalry since they could locate them easily from the air and were effective in low-level attacks.

AD-A086 108/8 PC **A07**/MF **A01**
Army Military Personnel Center Alexandria VA
Towards Organized Disorder: The Evolution of American Infantry Assault Tactics, 1778-1919.
Final rept.,
Henry J. Osterhoudt. 17 Dec 79, 148p
Master's thesis.

Tactical Evolution was a pragmatic process creating new methods in response to technological innovations which made previous doctrine too costly in lives to be effective. Assault tactics evolved in three phases. The first phase, which began during the Revolution reached successful maturity in the Mexican War and ended amidst the improved technology of the Civil War, was the use of the eighteenth century linear formation. The second, which evolved out of the Civil War and ended in World War I, was a linear formation composed of three lines of men: a firing line of skirmishers, followed by a second line called supports, and a third named reserves. During World War I, U.S. Infantry adopted a non-linear formation and the technique of fire and maneuver.

AD-A086 145/0 PC **A04**/MF **A01**
Army Materiel Systems Analysis Activity Aberdeen Proving Ground MD
Visibility Characteristics of Terrain and Their Effects on Weapon-System Performance.
Special publication.
Mar 80, 73p Rept no. AMSAA-SP-25

This study reviews the results of several experimental efforts each of which estimated the 'intervisibility' which existed between elements of attacker and defender armor forces. It was determined that discrepancies among the results of those efforts may be attributable to differences in the definitions of variables being measured, methods of analysis employed and the terrain on which the exercises were performed. A proposed set of definitions of terms pertinent to the intervisibility area are provided. (Author)

AD-A086 194/8 PC **A12**/MF **A01**
Naval Postgraduate School Monterey CA
Multidisciplinary Perspectives on Military Deception.
Final rept. 1 Jan-1 Oct 79,
Donald C. Daniel, Katherine L. Herbig, William Reese, Richards J. Heuer, and Theodore R. Sarbin. May 80, 256p Rept no. NPS-56-80-012
Contract MIPR-DSAM00005

Investigators from a variety of scientific and social scientific disciplines report results of a group research effort into the nature of military strategic deception. Seven essays are included. Basic concepts which define strategic deception and its variants are identified and the process of deception is analyzed using evidence from the recent past. Deception is found to be reliably advantageous to those who attempt it despite its susceptibility to unforseen contingencies. Psychological biases of individuals and characteristics of organizations are identified which may lend themselves to being deceived. Feedback is identified as a key element in successful deception. Communications theory, game theory, and systems theory are applied to deception to clarify the elements of a theory of de-

ception. Recommendations for countering deception and for further research in the area are made. (Author)

16. MISSILE TECHNOLOGY

16D. Missiles

PATENT-4 207 764 Not available NTIS
Department of the Air Force Washington DC
Precision-Fin Indexing Device for Wind Tunnel Models.
Patent,
Richard S. Wallace. Filed 5 Mar 79, patented 17 Jun 80, 4p AD-D007 377/5, PAT-APPL-6-017 626
Supersedes PAT-APPL-6-017 626-79, AD-D006 045.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An indexing device includes an adapter conforming to the contours of the test model body with a cavity for housing a ring gear which has internal teeth segments in two diametrically opposed quadrants and is rigidly attached to the adapter. A movable fin with an aerodynamic surface includes a cylindrical hub welded to the base portion thereof. The hub is provided with a central shaft extension which engages a close fitting opening in the adapter and with two curved slots to accept clamping fasteners that thread into tapped holes in the adapter. A spur gear, modified to mesh with the modified ring gear on the adapter, is bolted on the under surface of the hub concentric with the shaft extension. (Author)

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A086 054/4 PC **A10**/MF **A01**
Naval Oceanographic Office NSTL Station MS
Program Operating Procedures for the Integrated Command ASW Prediction System (ICAPS). Volume 1.
Final rept.
Apr 79, 216p Rept no. NOO-RP-24-VOL-1

This document introduces, explains, and provides detailed guidance for use of the ICAPS mini-computer programs. Step-by-step instructions for each program quickly direct the user from the initial time, temperature, and location data to a superior tactical assessment and prediction of submarine detection. The programs are described as follows: PROFGEN -- Generates a sound speed profile based on bottom type and historical data. FACT -- Constructs propagation loss curves for various source-receiver pairs and frequencies. LATRAN -- Computes lateral range curves based on the FACT data. GENRAYT -- Provides additional options for ray trace graphics and allows input of SVP data or temperature and salinity data. SHARPS -- Relates sonar operational capabilities for the active and passive propagation loss modes. ACTIVE -- Produces tables of detection ranges for active sonobuoys. TASDA Package -- Defines the detection capabilities and effectiveness of a given sonobuoy field. TAPS -- Graphically presents the detection coverage of towed array sensors. COMPASS -- Organizes search thinking and evaluates each step of the search. Together these programs provide comprehensive, detailed, clear, accurate, and rapid on-scene analysis of a submarine threat. (Author)

PAT-APPL-6-126 590 PC **A02**/MF **A01**
Department of the Navy Washington DC
Transducer Array Crossover Network.
Patent Application,
Claude C. Routh. Filed 3 Mar 80, 18p AD-D007 325/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A crossover network is coupled to each transducer in an array of acoustic transducers, each transducer having a different frequency band, and all of the crossover networks being coupled in parallel to a single driving amplifier. Each crossover network includes a network inductance connected in parallel with a transducer capacitance to form a parallel LC circuit, the resonant frequency of such circuit being equal to the resonant frequency of a transducer RLC series circuit. The network inductance of each network is coupled to the amplifier in series with a driver inductance and a driver capacitance, which are respectively equal to the inductance and capacitance of the RLC series circuit of a transducer. (Author)

PATENT-4 205 396 Not available NTIS
Department of the Navy Washington DC
Automatic Difar Cardioid Former.
Patent,
Cabell N. Pryor, Jr. Filed 25 Mar 75, patented 27 May 80, 16p AD-D007 356/9, PAT-APPL-565 291
Supersedes PAT-APPL-565 291-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is an automatic method for forming a generalized cardioid pattern from the three hydrophone signals of the DIFAR system to remove bearing bias and produce a minimum noise signal channel to substitute for the omnidirectional signal as a reference. (Author)

PATENT-4 206 510 Not available NTIS
Department of the Navy Washington DC
Automatic Detection and Classification Device.
Patent,
Robert D. Strait. Filed 27 Jun 55, patented 3 Jun 80, 12p AD-D007 357/7, PAT-APPL-518 425
Supersedes PAT-APPL-518 425-55.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to automatic detection and classification devices and more particularly to such devices, hereinafter referred to as ADAC, having a gain loop providing a more constant amplitude at its output, a heterodyne correlator to attenuate noise burst other than the transmitted sonar pulses and to provide for utilization of circuits having greater simplicity, reliability, and efficiency.

PATENT-4 212 084 Not available NTIS
Department of the Navy Washington DC
Beam-Former for FFT-Based Signal Processor.
Patent,
Lynn A. Poole. Filed 20 Nov 78, patented 8 Jul 80, 9p AD-D007 358/5, PAT-APPL-962 538
Supersedes PAT-APPL-962 538-78, AD-D005 602.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a beam-former for sampling and digitizing a sonar signal preparatory to Fast Fourier Transformer (FFT) processing comprising an array of ceramic sensors forming a series of rows and columns, a sampling transformer for each row and each column for sampling the weighted sum of the signals from the sensors in each row or column, a log compressor for each sampling transformer for compressing the amplitude of the sampled signal an analog-to-digital (A/D) converter circuit following each log compressor for sampling and digitizing the compressed signals under the control of a counting circuit so that the log compressor outputs are sampled at prescribed times in relation to each other so as to impart a time or phase shift to the digitized outputs to effect a beam tilting, a decompression circuit for decompressing the time shifted signals, an accumulator for adding the samples from each row and column, and a shifting circuit for shifting the accumulated signal up or down to make it compatible with the FFT circuit.

17B. Communication

AD-A085 835/7 PC **A04**/MF **A01**
ARINC Research Corp Annapolis MD
Impact of Selected FAA Programs of Switched and Nonswitched Network Costs.
Final rept.,
I. Gershkoff. Apr 80, 60p 1339-01-8-2178, FAA-ASP-80-8
Contract DOT-FA77WA-4018

This report is an economic analysis of the alternatives of switching and nonswitching for approximately 5,000 voice circuits and 1,500 data circuits in the FAA's operational telecommunications network. The switching alternative assumed all circuits to be switched through the 20 continental air route traffic control centers (ARTCCs). an algorithm was developed to calculate the impacts of switching or consolidation on the number of circuits and circuit mileage required in the network. On the basis of an assumed tariff rate, dollar savings resulting from the network reconfigurations were calculated. The alternatives were analyzed for the present communications network with its forecasted growth (baseline) and for selected scenarios that considered the impact of four new FAA programs (DABS, ETABS, VSCS, and AFSS).

AD-A085 845/6 PC **A08**/MF **A01**
ITT Defense Communications Div San Diego CA
Speaker Authentication Operational Test and Evaluation.
Final technical rept. 22 Sep 78-6 Nov 79,
Edwin H. Wrench, Jr. Apr 80, 157p RADC-TR-80-64
Contract F30602-78-C-0324

The long term goal of this program is to implement a realtime speaker recognition system that can be operated by untrained personnel. The objective of the present contract was to demonstrate the feasibility of using speaker recognition techniques to aid in the identification of unknown speakers. The contract was conducted in two phases. The first was the algorithm selection phase, in which various speaker recognition techniques were implemented and tested to determine the optimal technique to satisfy the specific program requirements. The second phase of the program was to implement the selected technique in a laboratory demonstration system, and to develop a convenient, easy to use operator interface to the system. The most difficult task was to develop a text independent speaker recognition technique that would achieve a high level of recognition accuracy with only 10 seconds of training data for each talker. Previous text independent speaker recognition techniques had been reported that had achieved the required accuracies, but all had used several minutes of training data to generate the speaker reference models. In addition, recognition was accomplished in most of these studies by using at least one minute of unknown speech.

AD-A085 920/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Efficient Packet Satellite Communications.
Journal article,
Joseph K. DeRosa, Lawrence H. Ozarow, and Leslie N. Weiner. 15 Jan 78, 8p JA-4846, ESD-TR-79-354
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Communications, vCOM-27 n10 p1416-1422 Oct 79.

No abstract available.

AD-A085 927/2 MF **A01**
Naval Postgraduate School Monterey CA
A Methodology for Determining Command, Control, and Communications (C3) Requirements for Remotely Piloted Vehicles (RPVs) and Unmanned Drone Aircraft.
Master's thesis,
John Harvey Newton. Mar 80, 70p

This work describes and illustrates a method for determining command, control, and communications (C3) requirements for remotely piloted aircraft (RPA). The effort was limited to airborne platforms and investigation of the following issues: manned versus unmanned aircraft; unmanned aircraft as RECON/DESIGNATION platform; un-

manned aircraft as weapon delivery platform; C3 requirements for unmanned aircraft; and unmanned aircraft system cost effectiveness. Warsaw Pact forces will be led and employed according to Soviet operational doctrine which calls for offensive operations with highly mobile, deeply echeloned, and numerically superior land forces, supported by air and sea power. This massive enemy threat indicates a requirement that the maximum number of forces be detected, identified, and destroyed prior to engaging friendly forces. Destruction of enemy forces can be accomplished with artillery, attack helicopters, and close air support, if those targets can be identified and located with sufficient accuracy for timely targeting.

AD-A085 949/6 MF **A01**
Naval Ocean Systems Center San Diego CA
Automatic Loudspeaker Control (ALC). A Summary of Development and Design.
Final rept. Oct 76-Sep 79,
E. Schiller. 1 Jan 89, 57p Rept no. NOSC/TR-434
Availability: Microfiche copies only.

The automatic loudspeaker control (ALC) senses ambient noise levels in a given space and automatically adjusts the loudspeaker output serving that space. This eliminates hazardous loudspeaker outputs in confined spaces and, more importantly, assures unimpaired reception of vital information. In addition to covering the design approach, system description, and planned system deployment, this report also provides a listing of ALC documents available from NOSC and appendices of the primary technical data and evaluations for the ALC.

AD-A085 972/8 PC **A03**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Efficient Encoding and Decoding of Speech.
Quarterly progress rept. no. 2, 1 Feb-30 Apr 80,
M. Berouti, M. Krasner, and J. Makhoul. May 80, 39p Rept no. BBN-4384
Contract MDA904-79-C-0411

We report on continued research to improve the APC algorithm. The issue of system stability as a function of the linear prediction filter is discussed and a method for improving performance presented. The issue of computational complexity is also addressed. A new filter that reduces the computational load of the algorithm is designed for use in the resampling operations. (Author)

AD-A085 984/3 PC **A02**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
High Frequency MODEM for Advanced Narrowband Digital Voice Terminal.
Final rept.,
M. Adler. Mar 80, 17p Rept no. TRW-32191
Contract N00014-77-C-0580

This report describes the Software developed for the HF MODEM for the ANDVT contract. The transmitter and the receiver are described.

AD-A086 020/5 PC **A05**/MF **A01**
ARINC Research Corp Annapolis MD
FAA Communications Cost Model Program Documentation. Revised,
W. Kolb, R. Tanke, and I. Gershkoff. Apr 80, 88p 1339-01-7-2174-REV, FAA-ASP-80-7
Contract DOT-FA77WA-4018
Supersedes report dated May 79. See also Rept. no. FAA-ASP-80-6 and FAA-ASP-80-8.

The FAA Communications Cost Model is a computer program designed to answer management questions dealing with long-term, national-level communications planning issues. Therefore, the program is purposely directed toward estimating long-term macro-level (as opposed to near-term, micro-level) communications costs. The algorithms used emphasize cause-and-effect relationships (rather than direct extrapolation of cost data) to predict costs. This report documents the communications model computer program. It includes a description of model equations, functional flow charts, and the program listings. It should be used in conjunction with the revised FAA Communications Model User's Guide* for a comprehensive understanding of the computer software. The edition supersedes the issue dated May 1979.

AD-A086 081/7 PC **A04**/MF **A01**
Science Applications Inc La Jolla CA
Real-Time Applications of Optical Signal Processing to Command and Control Communications.
Final technical rept. Apr 78-Sep 79,
W. Stoner, E. Garber, F. Horrigan, G. Collins, and J. Phelps. Apr 80, 55p RADC-TR-80-86
Contract F19628-78-C-0117

The program reported on in this final report was directed towards development of real-time optical signal processing for C3 and radar applications. Specifically, these applications were A/D conversion, spread spectrum code acquisition and decoding, and clutter rejection in look-down radar. In the context of these applications and through discussions with RADC/ET, technical goals were framed, such as a goal of A/D conversion at 1 Ghz. New optical signal processing techniques were conceived to meet the technical goals. These new approaches include a noncoherent kaleidoscope system for A/D conversion, and a noncoherent optical correlation technique which accommodates the bipolar and complex-valued signals encountered in spread spectrum communications and in radar. During the course of our program, determinations were made of the specific hardware best suited for the testing and demonstration of these novel approaches. These determinations were made by theoretical calculations and by consulting with the literature. Experimental tests of many subsystems, such as the noncoherent correlator optics and acousto-optic Bragg cells for introducing signals into the correlator in real-time, were tested at RADC/ET. Investigations were also made of computer generated holograms for use as pupil masks in the noncoherent correlator. (Author)

AD-A086 123/7 PC **A03**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Development of a Voice Funnel System.
Quarterly rept. no. 4, 1 May-31 Jul 79,
M. Hoffman. Jun 80, 31p Rept no. BBN-4182
Contract MDA903-78-C-0356, ARPA Order-3653

This Quarterly Technical Report covers work performed during the period noted on the development of a high-speed interface, called a Voice Funnel, between digitized speech streams and a packet-switching communications network. (Author)

AD-A086 132/8 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Development of a Voice Funnel System.
Quarterly technical rept. no. 5, 1 Aug-31 Oct 79,
M. Hoffman. Jun 80, 22p Rept no. BBN-4396
Contract MDA903-78-C-0356, ARPA Order-3653

This Quarterly Technical Report covers work performed during the period noted on the development of a high-speed interface, called a Voice Funnel, between digitized speech streams and a packet-switching communications network.

AD-A086 133/6 PC **A12**/MF **A01**
Notre Dame Univ IN Dept of Electrical Engineering
Design and Implementation of a Speech Coding Algorithm at 9600 B/S. Volume 1.
Final rept. Nov 78-Apr 80,
James L. Melsa, David L. Cohn, Arvind Arora, James M. Kresse, and Arun K. Pande. 30 Apr 80, 271p
Contract DCA100-79-C-0005
See also Volume 2, AD-A086 134.
Availability: Microfiche copies only.

This report describes a speech coding algorithm for digital transmission of speech at a rate of 9600 bits per second and the implementation of this algorithm on a speech processing system. The algorithm combines: pitch extraction loop, pitch compensating adaptive quantizer, sequentially adaptive linear predictor, and adaptive source coding to generate very high quality speech output. Although each of these elements has been previously applied to speech coding, the combination of all four of these elements has not been studied before. The speech coding algorithm has been implemented on a pair of CSPI MAP 300 Array Processors in real-time in the full-duplex mode. This report has been bound in two volumes. The first volume contains the narrative description of the algorithm and its development and includes Chapters 1 through 11 and Appendices A through D of the report.

AD-A086 134/4 MF **A01**
Notre Dame Univ IN Dept of Electrical Engineering
Design and Implementation of a Speech Coding Algorithm at 9600 B/S. Volume 2.
Final rept. Nov 78-Apr 80,
James L. Melsa, David L. Cohn, Arvind Arora, James M. Kresse, and Arun K. Pande. 30 Apr 80, 265p
Contract DCA100-79-C-0005
See also Volume 1, AD-A086 133.
Availability: Microfiche copies only.

This report describes a speech coding algorithm for digital transmission of speech at a rate of 9600 bits per second and the implementation of this algorithm on a speech processing system. The algorithm combines: pitch extraction loop, pitch compensating adaptive quantizer, sequentially adaptive linear predictor, and adaptive source coding to generate very high quality speech output. Although each of these elements has been previously applied to speech coding, the combination of all four of these elements has not been studied before. The speech coding algorithm has been implemented on a pair of CSPI MAP 300 Array Processors in real-time in the full-duplex mode. This report has been bound in two volumes. The second volume describes the real-time MAP implementation and includes Chapters 12 and Appendices E through G.

AD-A086 146/8 PC **A08**/MF **A01**
Rockwell International Thousand Oaks CA Electronics Research Center
Multi-Processor Bus Architecture.
Final technical rept. 15 Sep 78-14 Sep 79,
Henry F. Taylor. Jun 80, 152p Rept no. ERC41015.4FR
Contract MDA903-78-C-0463, ARPA Order-3671

This report summarizes the results of a one-year study of very high data rate fiber optic buses for computer networks. The primary objectives were to: (1) assess the data rate limitations of components and systems for optical fiber communications, (2) develop a preliminary design for a very high-data-rate optical bus with microprocessor interfaces, and (3) recommend a program of technology development directed towards implementation of such a bus. Mathematical models developed during the course of this program were used extensively for investigating the data rate limitations. The performance of each component was optimized by varying the key parameters, within limits consistent with the properties of known materials and fabrication techniques. The analysis indicates that best performance, as well as lowest cost and highest reliability, can be achieved by integrating all of the components for a bus terminal (except for the optical fiber) on a single semi-insulating gallium arsenide substrate. a technology development plan directed towards the realization of the optoelectronic integrated circuits needed for a very high-data-rate optical bus incorporating the features indicated above is outlined.

AD-A086 167/4 PC **A04**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Evaluation of the Aviation Weather and NOTAM System (AWANS).
Final rept. Aug 75-Sep 76,
Hugh D. Milligan, and Bruce L. Rosenberg. Jun 79, 51p FAA-NA-79-13, FAA-RD-79-46

This activity was conducted to ascertain the operational effectiveness of an experimental system in providing automation capabilities geared to flight service station application. Primary consideration was given to the man-machine relationship and the efficacy of the data and presentation formats made available to the specialist through the system. Maintenance, technical, and software aspects were not specifically addressed. Results of the study indicate that the automated system provides textual and graphic data in a form suitable for use in preflight and in-flight briefing modes. Further, the equipment configurations under study contained one which was acceptable, though not deemed optimal, by the specialists. This acceptability included the display size, character size and font, graphic and textual products, communica-

tions equipment, console design, and associated equipment layout. (Author)

AD-A086 215/1 PC **A08**/MF **A01**
Computer Sciences Corp Falls Church VA
Integrated Nuclear Communications Assessment (INCA). Circuit Restoral Assessment Module.
Topical rept. 7 Nov 77-31 Jan 79,
C. Hamilton, C. Owlett, P. Parenteau, P. Fox, and M. Meitzer. 7 Sep 79, 162p DNA-4351T-2E, AD-E300 814
Contract DNA001-78-C-0087

This report provides software documentation of the Circuit Restoral Assessment Module (CRAM) developed by Computer Sciences Corporation. The report includes algorithm flow charts and descriptions, the data base build description and sample outputs. (Author)

EGG-2015 PC **A05**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Packet Switching.
K. W. Derr. Mar 80, 83p
Contract EY-76-C-07-1570

This report assembles information on the theories of store-and-forward packet switching, and surveys existing operational packet-switching networks. It includes a comparison of the types of packet switching; packet-switching techniques; procedures for controlling errors, flow, and congestion; and protocol layers used in packet-switching networks. 132 references, 25 figures, 2 tables. (ERA citation 05:025109)

N80-26573/9 PC **A13**/MF **A01**
Telephonics, Huntington, NY.
Wireless Microphone Communication System Telephonics p/N 484D000-1.
1980, 281p NASA-CR-160731, WMCS-001
Contract NAS9-14824

The wireless microphone is a lightweight, portable, wireless voice communications device for use by the crew of the space shuttle orbiter. The wireless microphone allows the crew to have normal hands-free voice communication while they are performing various mission activities. The unit is designed to transmit at 455 or 500 kilohertz and employs narrow band FM modulation. Two orthogonally placed antennas are used to insure good reception at the receiver.

N80-26575/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Communications Via the Radio Artificial Earth Satellite: Design of the Tracking Diagram and Features for Conducting Qso.
V. Dobrozhanskiy, and V. Rybkin. Mar 80, 17p
NASA-TM-76105
Contract NASW-3198
Transl. Into English from Provedennya Qso Radio. (USSR), No. 1, 1979 p 17-20. Transl. By Scientific Translation Service, Santa Barbara, Calif.

A detailed examination is made of the operation of a transmitting artifical Earth satellite. A tracking diagram for the satellite is constructed. The zone of radio visibility can be determined based on the techniques proposed.

N80-26576/2 PC **A04**/MF **A01**
Axiomatix, Los Angeles, CA.
Shuttle Orbiter Ku-Band Radar/Communications System Design Evaluation. Ku Band Bent-Pipe Channel Performance Evaluation.
Interim Report.
J. K. Holmes, and J. G. Dodds. 20 Jun 80, 54p
NASA-CR-160696, R8006-5
Contract NAS9-15795

Because of difficulties with the bit detector of the SPA mode 1 channel 3 input port, a new bit synchronizer was required. The two prime candidate designs are described and analyzed. The selected design is a modification of one which utilizes a phase frequency detector to track the received data clock frequency and a mid-bit transition point sample detector to generate a bit timing error (phase error) signal to control the relative phase between the local clock and the local data stream. The model used to calculate the effects of cable attenuation and rise time degradation is discussed.

N80-26579/6 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Engineering Systems.
Cost Comparison of Competing Local Distribution Systems for Communication Satellite Traffic.
F. E. Dopfel. Oct 79, 15p NASA-CR-163282, SU-26
Contract NASW-3204

The boundaries of market areas which favor various means for distributing communications satellite traffic are considered. The distribution methods considered are: control Earth station with cable access, rooftop Earth stations, Earth station with radio access, and various combinations of these methods. The least cost system for a hypothetical region described by number of users and the average cable access mileage is discussed. The region is characterized by a function which expresses the distribution of users. The results indicate that the least cost distribution is central Earth station with cable access for medium to high density areas of a region combined with rooftop Earth stations or (for higher volumes) radio access for remote users.

N80-27214/9 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Engineering-Economic Systems.
Economic Aspects of Spectrum Management.
R. D. Stibolt. Oct 79, 43p NASA-CR-163279, SU-25
Contract NASW-3204

Problems associated with the allocation of the radio frequency spectrum are addressed. It is observed that the current method very likely does not allocate the resource to those most valuing its use. Ecomonic criteria by which the effectiveness of resource allocation schemes can be judged are set forth and some thoughts on traditional objections to implementation of market characteristics into frequency allocation are offered. The problem of dividing orbit and spectrum between two satellite services sharing the same band but having significantly different system characteristics is discussed. The problem is compounded by the likelihood that one service will commence operation much sooner than the other. Some alternative schemes are offered that, within proper international constraints, could achieve a desired flexibility in the division of orbit and frequency between the two services domestically over the next several years.

PAT-APPL-6-122 335 PC **A03**/MF **A01**
Department of the Navy Washington DC
Fiber Optic System for Transmission of Video Signals by Pulse-Frequency-Modulation.
Patent Application,
Steven J. Cowen. Filed 19 Feb 80, 30p AD-D007 326/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a fiber optic system utilizing pulse-frequency modulation (PFM) for transmission of video information signals substantially enhances the signal-to-noise ratio of the transmitted video signals. FM processing gain is realized together with system noise reduction which results from operation of the fiber optic components in a pulsed mode. The amplitude of a video signal modulates the repetition frequency of a stream of narrow light pulses emitted by a laser diode. The pulses are transmitted through a low loss, wideband optical fiber to an avalanche photodiode biased at an optimum gain point. Further improvement is possible when preemphasis processing of the video signal is performed prior to transmission. (Author)

PAT-APPL-6-143 399 PC **A03**/MF **A01**
Department of the Navy Washington DC
Pulse Compression System.
Patent Application,
Bernard L. Lewis. Filed 24 Apr 80, 33p AD-D007 318/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a system for polyphase encoding transmitted pulses of energy and for decoding the received signals to enhance returns from the range interval being examined during a particular processing period and attenuate returns from contiguous range intervals (pulse compression). The system includes a decoding device which comprises a delay circuit having N distributed outputs including its input for producing a uniform delay between adjacent outputs corresponding to N inputted elements of a received phase-coded signal of length N-squared; a conjugator circuit coupled to the first N/2 successive outputs of the delay circuit; a first signal-combining circuit coupled to the conjugator circuit and to the last N/2 successive outputs of the delay circuit; a multiplier circuit coupled to the first signal-combining circuit; and second signal-combining circuit coupled to the multiplier circuit.

PATENT-4 199 809 Not available NTIS
Department of the Navy Washington DC
Programmable Data Terminal Set.
Patent,
Edward J. Pasahow, and Carlos Nuese. Filed 5 Apr 76, patented 22 Apr 80, 34p AD-D007 346/0, PAT-APPL-674 025
Supersedes PAT-APPL-674 025-76, AD-D002 601.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An operator console, a general purpose digital computer and a radio set interface are connected to perform the modulation and demodulation of the differential coherent quadrature phase shift signal used to transmit the digital information over a computer-to-computer radio link. The console is used to initiate communications and to control and monitor link operation. The computer performs all of the signal processing and control functions. The radio set interface performs analogue-to-digital (A/D) and digital-to-analogue (D/A) conversions for the received and transmitted signals, respectively. The programmable data terminal set (PDTS) also controls the data link operation and sequencing and tests its own performance during operation.

PATENT-4 207 460 Not available NTIS
Department of the Air Force Washington DC
Low Power Frequency Modulated Hybrid Fiber Optic Data Acquisition System.
Patent,
Joseph M. Hudak, Gerald L. Zielinski, and Charles G. Messenger. Filed 12 Oct 78, patented 10 Jun 80, 4p AD-D007 370/0, PAT-APPL-950 751
Supersedes PAT-APPL-950 751-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a fiber optic data transmission apparatus utilizing a modulated hybrid transmitter to transfer data with complete electrical isolation to a remote data reception and utilization center. (Author)

PB80-194459 PC **A06**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Impact of Satellite Power System (SPS) Heating on VLF, LF, and MF Telecommunications Systems Ascertained by Experimental Means.
C. M. Rush, E. J. Violette, R. H. Espeland, J. C. Carroll, and K. C. Allen. Apr 80, 105p NTIA-R-80-37

The report summarizes the results of experiments undertaken to assess the potential impact of the operation of the Satellite Power System on the D and E regions of the ionosphere, and on telecommunication systems that are dependent upon the structure of the lower ionosphere. Using the high-power high-frequency transmitter facility located at Platteville, Colorado, power densities comparable to the Satellite Power System can be delivered to the heights of 70 to 100 km above the surface of the earth. Observations of the performance of telecommunication systems that operate in the VLF, LF, and MF portions of the spectrum have been

investigated during times when the ionosphere was modified with SPS comparable power density and when it was not. The results obtained indicate that the SPS, as currently configured with a peak power density of 23 mW/sq cm, will not adversely impact upon the performance of VLF, LF, and MF telecommunication systems.

PB80-196413 CP **T06**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Land Mobile Base Station Data Base.
Data file,
John M. Guili. 1980, mag tape FCC/DF-80/008
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-295 974.

The file contains data provided by common carriers in the Land Mobile Base Station Industry. The data is categorized under three phases: pending, under construction, and licensed. Each applicant/communication system is described according to ownership, location data, antenna data, transmitter data, and then relationship(s). The system generates Construction Permits, Station File Jackets, Licenses, and a monthly Data Base Listing.

PB80-196421 CP **T02**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Common Carrier Earth Station Application File.
Data file,
John M. Guili. 30 Jun 80, mag tape FCC/DF-80/015
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This tape contains the Common Carrier Earth Station Application File used by the Common Carrier Bureau in processing applications for licenses and permits. It consists of 3958 applications at this time. Each application is made up of 5 records containing such information as the status of the station, identification information, technical information, frequency information and any special provisions.

PB80-197437 CP **T03**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Common Carrier Industry Consolidation, 1978.
Data file,
John M. Giuli. 1978, mag tape FCC/DF-80/010
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-282 076.

This tape contains data describing traffic quantities by carrier (International Record Carrier) and by country point (International, Canada, and Mexico). Services covered include Telephone, Telegraph, Telex, Market Quotation, Overseas Press Bulletin, Stock Ticker, Leased Channel, TV Audio and Video, Addressed Press Service, Scheduled Photo and Program Transmission and Reception Service, Facsimile, Addressed Program Service, Datel, etc.

PB80-199433 PC **A04**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Effect of Small Frequency Changes on the Radiation Patterns of MF (AM) Directional Antennas,
Arthur C. Stewart, and John B. Heffelfinger. May 80, 61p NTIA/REPORT-80-39

The pressure to provide additional full time facilities in the AM (standard broadcasting) band in the United States resulted in a rulemaking petition filed with the Federal Communications Commission (FCC). The petition proposed the reduction of the AM channel spacing from 10 to 9 kHz. According to the suggested frequency allocation plan, the maximum frequency change required for any standard AM broadcast station would be plus or minus 4 kHz. A study was conducted both theoretically and experimentally to determine the magnitude of the radiation pattern changes that would be caused by a plus or minus 4 kHz frequency change for stations using directional antenna arrays. Additionally, a computer study of the 1430 kHz regional channel was conducted to determine the effects of a plus or minus 4 kHz frequency change on the interference levels suffered by co-channel stations. The results of the study demonstrate that the effects of small frequency changes on the radiation patterns of directional antenna arrays are greater in practice than theoretical predictions would indicate, but that the required pattern corrections could probably be quickly and easily effected.

PB80-808520 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Adaptive Communication. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Robert Hippler. May 80, 71p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works describe a variety of approaches to the problem of maintaining electronic communication, or radar operation, through noise, atmospheric variables, enemy jamming, and interference from other channels. Antenna array design, matched filters, coding, phase modulation and other approaches to solving the problem are discussed. (Contains 60 citations)

17D. Electromagnetic and Acoustic Countermeasures

AD-A086 050/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
A Phase Correction System to Improve the Quality of a Wideband Chirp Signal.
Technical note,
Buchanan Loesch. 5 Feb 80, 24p TN-1980-8, ESD-TR-79-303
Contract F19628-80-C-0002

A phase correction circuit which significantly improves the linearity of a wideband (hundreds of MHz) chirp signal has been constructed and tested. This correction circuit is applicable to a chirp generator in which a digital system is used to compute the phase of the chirp signal once each clock cycle, and the chirp signal bandwidth is then restricted to appreciably less than the clock frequency; analog frequency multiplication is then used to obtain the required bandwidth. The circuit described here corrects the high frequency phase errors which are present after the multiplication process. (Author)

17E. Infrared and Ultraviolet Detection

PATENT-4 144 540 Not available NTIS
Department of the Navy Washington DC
Tunable Infrared Detector with Narrow Bandwidth.
Patent,
Nicholas Bottka. Filed 6 Feb 78, patented 13 Mar 79, 4p AD-D007 327/0, PAT-APPL-875 254
Supersedes PAT-APPL-875 254-78, AD-D004 822.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An infrared detector with narrow band tunable response is disclosed. The detector is composed of four layers of epitaxially grown material that is doped for selective wavelength absorption. The uppermost layer has a thickness much larger than the penetration depth of short wavelength radiation or the diffusion length of photo generated carriers near the surface. The upper layer is a heavily N-doped layer over a P-doped layer. The cut-on wavelength edge is determined by the amount of doping in the uppermost layer. By applying a reverse bias to this N-P junction, the cut-off absorption edge can be shifted to longer wavelengths. (Author)

17G. Navigation and Guidance

AD-A085 825/8 PC **A04**/MF **A01**
Analytic Sciences Corp Reading MA
Seasonal Sensitivity Analysis of the St. Mary's River Loran-C Time Difference Grid,
Interim rept. Mar-Jun 78,
L. M. DePalma, and R. R. Gupta. Jun 78, 61p TASC-TIM-1119-3, USCG-D-33-80
Contract DOT-CG-81-77-1785

Large temporal variations have been observed in St. Marys River Loran-C time difference (TD) measurements. As a first step in determining the cause of this instability, the sensitivity of the TD grid to expected seasonal variations in Loran-C signal propagation conditions has been determined. The sensitivity analysis is based on theoretical propagation delay models and expected seasonal variations in the propagation parameters -- surface refractive index of air, the parameter associated with refractive index gradient, and ground conductivity. The analysis results show that conductivity, which is the parameter least amenable to measurement, is also the parameter which is most critical to grid stability. It is shown herein that the assumed variations in conductivity cannot explain observed variations in the TD data. Predicted TD variations due to seasonal grid instability are employed to predict the corresponding position errors at reiver waypoints. The resulting position errors are combined with those predicted for the case of no grid instability to provide predictions of total position error. (Author)

AD-A085 836/5 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Special Evaluation Report, AN/FPN-55 Passive Feedhorn. Travis AFB, California.
Final rept. 26 Feb-31 Mar 80,
Thomas J. Verbeck, Donald L. Larson, and Kennett M. Slater. 10 May 80, 34p Rept no. 80/66S-209

This report presents data collected 26 Feb - 5 Mar and 24 Mar - 31 Mar 1980 to study the effectiveness of the passive feedhorn sectorization and the utilization of this feature by local air traffic personnel. This study was required in order to determine system involvement in a substantial increase in aircraft near misses reported by aircrews flying within the Travis area. The AN/FPN-55 passive feedhorn's capabilities and limitations in the tracking of light/small cross sectioned aircraft were documented, and those system capabilities and limitations presented in the December 1976 TRACALS reports were verified. (Author)

AD-A085 944/7 PC **A05**/MF **A01**
Army Missile Command Redstone Arsenal AL Guidance and Control Directorate
Pershing PII Inertial Measurement Unit Calibration Trend Study.
Technical rept.,
H. V. White. Mar 80, 87p Rept no. DRSMI/RG-80-20

This report presents an overview of calibration data taken from Advanced Development Program Inertial Measurement Units. Behavior of calibration parameters is examined and worst/best performers are identified. Time trends are investigated by the method of linear least squares regression. Continued surveillance of parameters, determination of the effects of ill-behaved parameters on alignment and flight performance, and minimization of time required to perform a calibration are tasks to be performed during the Engineering Development program. (Author)

AD-A086 001/5 PC **A08**/MF **A01**
Coast Guard Washington DC Office of Research and Development
Precision Loran-C Navigation for the Harbor and Harbor Entrance Area,
D. L. Olsen, J. M. Ligon, A. J. Sedlock, and C. E. Isgett. May 80, 154p Rept no. USCG-D-34-80

Updates and consolidates three papers presented at the Annual Technical Symposium of the Wild Goose Association (8th) on 17-19 Oct 79 at Williamsburg, VA.

the U. S. Coast Guard is engaged in a long-term program to evaluate the potential and develop the technology for precision navigation using Loran-C. The Coast Guard has taken a three-pronged approach to harbor and harbor entrance (HHE) navigation-user equipment development, time difference (TD) surveying, and grid stability analysis. These three aspects of HHE Loran-C navigation were addressed in separate papers presented in October, 1979. This report updates and consolidates the three papers, and is intended to serve as a source document on the Coast Guard's approach to HHE Loran-C navigation. User equipment is being developed which combines time differences from a precision Loran-C receiver with survey information from a data tape cassette using simple algorithms to present the piloting situation on a CRT display. The algorithms, hardware, and software are described, and the results of summer and winter 1979 tests on the St. Marys River are given. It is concluded that accuracies of better than 25 meters are achievable. Three methods are described for surveying the Loran-C time difference coordinates of waypoints and prominent physical features of a harbor area for precision Loran-C navigation. Resutls are presented from field measurements on the St. Marys River Mini Loran-C Chain using existing visual aids to navigation as a position reference. The survey methods described provide for accurate and timely Loran-C grid survey over a wide range of harbor areas. The general features of each method and details of the visual aids to navigation approach are presented. Analysis of field measurements show survey capability on the order of ten nanoseconds.

AD-A086 004/9 PC **A07**/MF **A01**
Analytic Sciences Corp Reading MA
Design and Calibration of a Grid Prediction Algorithm for the St. Marys River Loran-C Chain.
Interim rept. Jul 77-Mar 78,
R. S. Warren, R. R. Gupta, and R. D. Healy. Mar 78, 143p TASC-TIM-1119-2, USCG-D-32-80
Contract DOT-CG-81-77-1785

Semi-empirical grid prediction techniques are used to develop a time difference (TD) grid prediction algorithm for the St. Marys River Loran-C Chain. The semi-empirical grid prediction technique uses classical theory to establish the functional form of a Loran-C signal propagation delay model and then measurement data are used to calibrate this model. The grid prediction effort described herein includes propagation model development, data collection site selection, data collection procedures, data quality analysis, algorithm calibration, algorithm accuracy assessment and TD grid chart production. Additional areas of study include an analysis of the interaction of errors due to temporal grid instability with System Area Monitor (SAM) control of the chain, and the analysis of errors in NOAA and Corps of Engineers charts for the St. Marys River region. The calibrated grid prediction algorithm, used to produce three 30 in x 40 inch TD charts of the region, utilizes a polynomial structure to capture the average spatial characteristics of the signal propagation delay over the coverage area. A residual TD grid prediction level of approximately 100 nsec/TD was achieved over the ensemble of data collection sites. Analysis of a limited amount of data recorded over a time period of four months suggests that this residual grid prediction error is probably due to temporal grid instability. Additional data analysis is required to validate this hypothesis. (Author)

AD-A086 043/7 PC **A05**/MF **A01**
Transportation Systems Center Cambridge MA
Interference and Noise in and Adjacent to the Loran-C Spectrum at Airports.
Final rept. Sep-Dec 79,
Peter G. Mauro. May 80, 86p TSC-FAA-80-8, FAA-RD-80-53

Electrical noise and interference in the LORAN-C frequency band was measured at two rural airports in Vermont and a major airport in Boston, Mass. The purpose of the test program was to determine the potential interfering sources that could affect the proper operation of the radio navigational system, LORAN-C, when it is used for non-precision approaches and terminal and en route navigation. Although no significant interference was observed, several continuous wave transmissions were identified in the frequency band adjacent to the LORAN-C band. (Author)

AD-A086 080/9 PC **A04**/MF **A01**
Transportation Systems Center Cambridge MA
Visual Confirmation of Voice Takeoff Clearance (VICON) Alternative Study.
Final rept. May-Dec 79,
Robert S. Yatsko. May 80, 61p TSC-FAA-80-2, FAA/RD-80-44

This report presents the results of a program undertaken to study potential alternatives to the VICON (Visual Confirmation of Voice Takeoff Clearance) System which has undergone operational field tests at Bradley International Airport, Windsor Locks, Connecticut since October 1979. The tests are scheduled for completion in March 1980. This report presents alternatives from two different viewpoints namely, those alternatives that can improve certain key components of the existing VICON System, and those proposing entirely different concepts than the current concept. (Author)

AD-A086 153/4 MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
Tracals Evaluation Report. Special Evaluation Report. AN/GRN-27 SSILS Glide Slope, Tyndall AFB, Florida, 22-26 January and 8-9 February 1980.
Final rept.,
Allen D. Clark. 30 May 80, 48p Rept no. 80/66S-197
Availability: Microfiche copies only.

This special evaluation was conducted to determine if the SSILS was performing optimally and if not, would a different equipment configuration improve performance. The equipment was reconfigured to capture effect and recommissioned by the 1866 Facility Checking Squadron.

AD-A086 171/6 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Initial Evaluation Report (AN/GPN-24) Nellis AFB, Nevada, 10 December 1979-6 Mar 1980.
Final rept.,
James R. Minsterl. 16 May 80, 92p Rept no. 80/66R-208

This report presents data collected to define the capabilities and limitations of the radar facility at Nellis AFB, Nevada. This report includes descriptions of the useable radar coverage and tracking capabilities, analysis of all flight and equipment performance data, and the performance predictions for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile.

AD-A086 186/4 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report, England AFB, Louisiana, 19-29 February 1980.
Final rept.,
Robert S. Antonio. 12 May 80, 93p Rept no. 80/66C-205

A Communications Initial Evaluation was performed at England AFB, Louisiana. The purpose of the evaluation was to define the capabilites and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communicaitons system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile.

AD-A086 197/1 PC **A02**/MF **A01**
Naval Weapons Center China Lake CA
Standoff Range Improvement of Electro-Optical Television Guidance Systems.
Interim rept. for period ending FY 1979,
Marc L. Moulton. Jan 80, 20p Rept no. NWC-TP. 6161

A technique for increasing the maximum range at which a target can be identified and acquired (standoff range) by a television electro-optical guidance system when used under hazy atmospheric conditions has been developed and flight-tested. The standoff range increase is obtained by extending and limiting the spectral response of the television camera to near infrared and incorporating electronic contrast enhancement to increase the target contrast. This method provides increased standoff range by factors from 2 to 4. (Author)

AD-A086 208/6 PC **A08**/MF **A01**
University of Southern California Los Angeles Image Processing Inst
Invariant Features for Quantitative Scene Analysis.
Final rept. 1 Sep 75-30 Jun 76,
Ernest L. Hall, and Werner Frei. 30 Jun 76, 162p AFAL-TR-77-253
Contract F08606-72-C-0008

This report summarizes a study of map matching technique for precision guided reentry vehicles using invariant measurements and scene analysis techniques. A particular case of matching optical and side looking radar images is considered in detail. Both geometric and sensor transformations are developed. Edge registration including a new vector representation of scenes which may be used to derive edge operators and unifies most edge operators currently in use, is presented. Invariant measurements depend on algebraic invariant theory and perceptual experience. The set of moment invariants are considered which are invariant to translation, rotation, size and mirror images, for computer for use. Finally, hierarchical search techniques which are logarithmetically efficient are presented for map matching. These techniques are illustrated with correlation measures of picture values, edge measurement and moment invariants. These techniques appear very effective for map matching. (Author)

AD-A086 228/4 MF **A01**
Army Military Personnel Center Alexandria VA
A Distributed Multiobject Tracking Algorithm for Passive Sensor Networks.
Master's thesis,
Richard P. Hughes. 23 Jun 80, 91p
Availability: Microfiche copies only.

The multiobject tracking problem is one that has gained much attention in recent years. The primary difficulty is the subproblem of associating measurements among several (perhaps an unknown number) of targets. In the present work, a recently proposed algorithm is modified and extended for application in distributed processing passive networks. This is done by distributing the measurement-target association problem to the individual sites in the network and then combining each site's resulting associations to form the desired target tracks. Computer simulations were run to demonstrate the capabilities of the procedure.

N80-26382/5 PC **A03**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
Analysis of the RIM Inertial Measuring System (RIMS).
Progress Report, 21 Oct. 1979 - 21 Feb. 1980.
S. M. Joshi. May 80, 29p NASA-CR-159270
Contract NAS1-15648

Nonlinear equations of motion are derived for the rim inertial measuring system, which is mounted in a strapped down configuration on a carrier vehicle. The measurement and equations derived from angular rates and linear accelerations were interfaced with the dynamic model of a user defined carried vehicle. Two methods are presented for rate measurement, and the results of the nonlinear computer simulation are presented.

PATENT-4 197 543 Not available NTIS
Department of the Navy Washington DC

Display Processor for Aircraft Landing System.
Patent,
Bernard L. Lewis. Filed 13 Feb 79, patented 8 Apr 80, 9p AD-D007 343/7, PAT-APPL-6-011 834
Supersedes PAT-APPL-011 834-79, AD-D005 828.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A circuit for processing the azimuth error video signal of a monopulse receiver in an aircraft to separately but simultaneously display the heading and position of the craft. The azimuth error signal is simultaneously applied to a sample-and-hold (SAH) circuit, a delay means and a one-shot multivibrator (MV). The MV opens the SAH to accept the first ground-transmitter signal in a sequence, the SAH charging a capacitance to the magnitude of the signal, and then prevents the SAH from accepting any further signals in the sequence. The output of the SAH is subtracted from the delayed signal to obtain a video signal indicative of aircraft position, and the output of the first subtracter is subtracted from the delayed signal to obtain a video signal indicative of the aircraft heading. (Author)

PB80-194467 PC **A06**/MF **A01**
National Telecommunications and Information Administration, Annapolis, MD.
Spectrum Resource Assessment in the 2.7 to 2.9 GHz Band. Phase II: LSR Deployment in the Los Angeles and San Francisco Areas. Report No. 3.
Technical rept.,
Robert L. Hinkle. Apr 80, 112p NTIA/REPORT-80-38
See also report dated Aug 79, PB80-129323.

The National Telecommunications and Information Administration (NTIA) in the Department of Commerce undertook a detailed program to investigate the feasibility of deploying the Limited Surveillance Radars (LSR) in the 2.7-2.9 GHz band in the Los Angeles and San Francisco areas. The LSR is a Federal Aviation Administration (FAA) air traffic control radar planned for use at general aviation airports with high traffic density that do not qualify for the longer range Airport Surveillance Radars (ASR). This investigation was the third in a series of tasks undertaken by NTIA as part of a spectrum resource assessment of the 2.7-2.9 GHz band. The overall objective of the spectrum resource assessment was to assess the degree of congestion in the band in designated areas in the United States, and to promote more effective utilization of the band.

PB80-809015 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Gyrocompasses. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 38p
Sponsored in part by National Technical Information Service, Springfield, VA.

These abstracts are on the subject of gyrocompasses and related areas, such as navigation, inertial navigation, gyrocompass design and construction, and gyrocompass systems. Citations include some on Kalman and other types of electronic systems used in conjunction with the basic gyrocompass unit. Strap down systems are discussed. (Contains 35 citations)

17H. Optical Detection

AD-A085 922/3 PC **A04**/MF **A01**
New Mexico State Univ Las Cruces Physical Science Lab
On the Analytical Inversion of Lidar Returns from an Inhomogeneous Atmosphere.
Technical rept.,
James D. Klett. Apr 80, 52p ERADCOM/ASL-CR-80-0008-3
Contract DAAD07-79-C-0008

A new analytical method is presented for extracting attenuation and backscatter coefficients in an inhomogeneous atmosphere from the return signal of a monostatic, single wavelength lidar system. The inversion method can be applied using only information contained in the signal itself and, in sharp contrast to a well known related analytical inversion method, it is relatively tolerant of various characteristic errors and uncertainties. Inversion examples for a variety of conditions are presented and discussed. (Author)

AD-A086 173/2 PC **A05**/MF **A01**
Georgia Inst of Tech Atlanta
A Tracking Performance Study of Large Dimensioned Target through an Optical Sight.
Master's thesis,
Michael Luciano Morgillo. Jun 78, 76p
Contract DAAG39-77-C-0041

There have been many tracking studies performed throughout the years in laboratories where a subject is required to track a point on some form of visual display. Very few studies have been performed in the field environment with larger than point type targets. The purpose of this study was to determine the magnitude and distribution of error when tracking the unmarked center of mass of a large diameter circular target and eventually to compare these errors to those found in the tracking of a circular target with a marked aim point at the center of mass. The results show that the distribution of error did change as a function of visual angle. As visual angle increased, the distribution of error tended to change from what appeared to be a uniform distribution to a distribution that had the tendency to peak. This was illustrated in the frequency histograms and verified using the aforementioned statistical tools. The standard deviation of tracking error was approximately 57 percent larger using targets without marked aim points compared to targets with marked aim points. There was a slight decrease in standard deviation of error as targets become larger; however, this trend was not considered significant from a practical point of view.

PAT-APPL-6-140 398 PC **A02**/MF **A01**
Department of the Navy Washington DC
Two Color Narrow Bandwidth Detector.
Patent Application,
Nicholas Bottka, and Marian E. Hills. Filed 14 Apr 80, 9p AD-D007 320/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a narrow two color semiconductor detector created from the built in field between epitaxial layers due to interface traps. Opposite polarity on opposite sides of the interface result in a net photocurrent created on each side which flows in opposing directions. The substrate supporting the epitaxial layers provides a cutoff filter range for light entering through the substrate. (Author)

17I. Radar Detection

AD-A085 866/2 PC **A04**/MF **A01**
Eaton Corp Deer Park NY Ail Div
Analyses for Multistatic Geometric Image Correction.
Final technical rept. 18 Apr-19 Oct 79,
J. S. Prichard, R. A. Baker, and W. J. Capiti. Feb 80, 69p E034-1, RADC-TR-80-18
Contract F30602-79-C-0137

Polar format storage of two-dimensional monostatic synthetic aperture radar (SAR) data (gathered in the stretch-spotlight mode of operation) allows matched two-dimensional Fourier transform processing; it eliminates range walk, allowing maximum size field of view for a given resolution or finest resolution for a given size field of view. In a bistatic SAR system, iso-range and iso-Doppler contours are orthogonal only for zero bistatic angle. The range gradient diminishes as the bistatic angle is increased. When polar format storage is used, these effects result in increasing smearing (defocusing) and geometric distortion of the imagery as the bistatic angle is increased. Hence, such formatting is not matched to two-dimensional transform processing. A solution to the bistatic SAR image processing problem is provided by a new technique called coherent unskewing and reconstitution logic (Curl). The matched processing performance of the Curl technique is demonstrated using computer simulation of received data from a bistatic SAR system with two-dimensional geometry. The resulting imagery is sharply focused and is totally free of geometric distortion. (Author)

AD-A085 867/0 PC **A05**/MF **A01**
Atomic Weapons Research Establishment Aldermaston (England)
The Calculation of Radar Cross-Sections.
R. Pizer. Apr 80, 95p AWRE-0-44/79, DRIC-BR-73529

The object of this report is to provide a detailed description of the methods used in the CHAOS computer program for calculating radar cross-sections. The program is written in FORTRAN. The various physical approximations are described. These help to simplify Maxwell's equations. At first sight these would appear to limit the scattering bodies to open wire structures; however, extensions to surfaces both open and closed follow by further approximation. The numerical methods used to solve these equations are described.

AD-A085 886/0 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Quantization Effects on Digital MTI.
Technical rept.,
Yu-Hong Kwong. Jan 80, 64p Rept nos. R-868, UILU-ENG-80-2201
Contracts DAAG29-78-C-0016, N00014-79-C-0424

The processing of digital signals is rapidly approaching a dominant role in both communication and radar systems. However, the physical origin of many information-bearing signals is intrinsically analog and continuous-time in nature. Therefore, an effective interface between the analog and digital worlds is of significant importance in modern signal-processing. Very often the quality of analog-to-digital (A/D) conversion is the critical limiting factor in over-all system performance. (Author)

AD-A086 002/3 MF **A01**
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Circularly Polarized Measurements of Radar Backscatter from Terrain.
Contract rept. Aug 78-Aug 79,
E. A. Wilson, D. R. Brunfeldt, Fawwaz T. Ulaby, and J. C. Holtzman. Feb 80, 235p CRINC/RSL-TR-393-1, ETL-0201
Contract DAAK70-78-C-0121
Availability: Microfiche copies only.

This report documents the design changes to the University of Kansas MAS 8-18/35 scatterometer system required to incorporate a circular polarization capability and a subsequent backscatter measurement program. The modifications enable the MAS 8-18/35 system to acquire both linear (HH, HV, VV) and circular (RR, RL, LL) radar backscatter data over its entire operating range of 8-18 GHz and 35 GHz. The measurement program described herein consisted of measurements of the backscatter coefficient, as a function of the angle of incidence (0-80) at selected frequencies in the 8-18 GHz range using circular polarization. Targets studied included coniferous and deciduous trees, wet and dry asphalt and concrete and bare and plowed ground at various moisture conditions. Coniferous and deciduous tree measurements were taken in both August and November so that seasonal changes could be observed. (Author)

AD-A086 121/1 MF **A01**
Sperry Gyroscope Co Great Neck NY Sperry Div
Radar Resources Allocation Study.
Interim rept. 1 Oct 78-30 Sep 79,
F. J. Scire, and W. R. Hanley. Jan 80, 159p SG-4253-1143, RADC-TR-79-339
Contract F19628-78-C-0228
Availability: Microfiche copies only.

This interim report defines an advanced technology phased array baseline radar with potential for automatically allocating its resources according to a preselected set of algorithms. Performance data of the radar, operating in a minimally adverse environment, has been generated both mathematically and from the simulation runs of integrated radar, clutter and target math models. (Author)

AD-A086 157/5 PC **A05**/MF **A01**
Naval Research Lab Washington DC
An Analytical Study of Radar Returns in the Presence of a Rough Sea Surface.
Interim rept.,
H. R. Raemer. 12 Mar 80, 97p NRL-8369, AD-E000 437

The analytical study described in this report was originally undertaken in an attempt at a theoretical explanation of certain experimental results on radar return from ship targets corrupted by sea return. The analysis, like a number of previous treatments of this problem, is based on the classical perturbation approach credited to S. O. Rice. It assumes small fluctuations ('capillary waves') superposed on a large-scale 'sea swell.' Certain cross-correlation functions of the radar return are calculated. The radar-target system geometry is modeled, allowing for consideration of various antenna beam patterns, pulse shapes, sea-swell geometries and discrete targets on or near the sea surface. Terms beyond first order (second and third) are included in order to explain cross-polarization effects, which have been observed experimentally. Limited results on fourth-order terms are also obtained. However, when the analysis is carried only to fourth order and these terms are averaged, they do not contribute to the cross-polarization and their effect is seen only if specular returns are present.

AD-A086 189/8 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Belvoir VA Night Vision and Electro-Optics Labs
Measurements of Millimeter Wave Radar Transmission and Backscatter during Dusty Infrared Test II (DIRT II).
Final rept.,
F. C. Petito, and E. W. Wentworth. May 80, 40p
Rept no. DELNV-TR-0011

Recently there has been much interest expressed to determine the ability of millimeter wave radar to perform target acquisition during degraded visibility conditions. In this regard, one of the primary issues of concern has been the potential of high-explosive artillery barrages to obscure the battlefield from millimeter wave radar systems. To address this issue 95-GHz millimeter wave radar measurements were conducted during the Dusty Infrared Test II (DIRT II). This test was held at White Sands Missile Range, NM 18-28 July 1979. Millimeter wave transmission and backscatter measurements were performed during singular live firings and static detonations of 155-mm and 105-mm high-explosive artillery rounds in addition to static detonations of C-4 explosives. A brief description of the millimeter wave portion of the test and instrumentation is given. The data along with some preliminary conclusions are presented.

N80-26578/8 PC **A04**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Radar Emitter Recognition Using Pulse Repetition Interval.
R. M. Hawkes. Mar 80, 57p ERL-0132-TR, AR-001-976

A method for estimating radar emitter pulse repetition interval parameters from intercepted emissions is presented. Adaptive parameter estimates based on certain measurements are derived. The measurements are obtained by a readily implementable observation procedure. The approach can deal with emitters with variable pulse repetition interval in a dense environment. Computer simulation results for the techniques are included.

PAT-APPL-6-152 234 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Intruder Detection System having Multiple Discrete RF Sensor Elements Illuminated by a Remote RF Transmitter.
Patent Application,
K. V. N. Rao. Filed 22 May 80, 12p AD-D007 359/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Intruder detection and tracking is achieved by a detection system that utilizes multiple discrete R.F. energy receiving sensors and a remote RF transmitter that illuminates the sensors either simultaneously or in a prescribed time sequence. The sensors are preferably leaky coaxial cable elements that encompass resources to be protected. The presence of an intruder in the vicinity of a leaky coaxial cable modifies its R.F. field providing a change in the received power that is processed by R.F. receiver and indicating circuits to produce an alarm. Intruder event information is also displayed as a function of sensor location to provide intruder tracking capability. (Author)

PATENT-4 207 560 Not available NTIS
Department of the Air Force Washington DC
R F Area Intruder Detection and Tracking System.
Patent,
J. Leon Poirier. Filed 23 Aug 78, patented 10 Jun 80, 9p AD-D007 376/7, PAT-APPL-936 160
Supersedes PAT-APPL-936 160-78, AD-D005 367-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The detection, location and tracking of an intruder in an area to be protected is accomplished by dividing the area into a multiplicity of discrete regions, transmitting r.f. signals from transmitting transducers that comprise lengths of transmission lines deployed along the boundaries of the discrete regions, and receiving intrusion occurrence signals from receiving transducers located with each region. Violation of a boundary by an intruder results in an intrusion signal from the receiving transducers of as many as four possible adjacent regions thereby indicating an intrusion event. A coincidence logic circuit indicates which boundary has been violated. Intrusion occurrence signals are stored for suitable periods of time while past and current intrusion events are indicated on a display in order to locate and track intruders. (Author)

17J. Seismic Detection

AD-A085 879/5 PC **A06**/MF **A01**
Teledyne Geotech Alexandria VA Seismic Data Analysis Center
Analysis of Selected Seismic Events from Asia in a Seismic Discrimination Context.
Technical rept.,
P. A. Sobel, and D. H. von Seggern. 21 Sep 78, 105p Rept no. SDAC-TR-78-5
Contract F08606-78-C-0007, ARPA Order-2551

This study examines earthquakes in Kamchatka, the Tien Shan, the Pamirs, the Baikal rift zone, and the Caucasus and explosions in the Aleutians, East Kazakh, West Kazakh, Southwest Russia, Lop Nor, and Baikal in a seismic discrimination context. Because of their low magnitudes (m sub b from 4.2 to 6.0 and M sub s from 3.2 to 5.8) and their varying propagation effects, it was impossible on the basis of first motions or LR amplitudes to determine source mechanisms for most of the earthquakes. Seismograms from the arrays ALPA, LASA, and NORSAR, the HGLP and the WWSSN stations were analyzed for m sub b, M sub s, corner frequency, long-period spectral level, long-period and short-period body-wave excitation, complexities, spectral ratios, radiation patterns, depth of focus, and higher-mode surface waves. The major successful discriminants for our data set were found to be M sub s-m sub b and identification of pP. In a stepwise linear discrimination analysis using the discrimination parameters M sub b, M sub s, corner frequency, complexity, spectral ratio, and long-period spectral level, the earthquakes were separated from the explosions with high confidence. In addition, some separation by region was evident for the earthquakes alone.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

ANU-PRL-1/79 PC **A02**/MF **A01**
Australian National Univ., Canberra. Plasma Research Lab.
Large Stellarator Based on Modular Coils.
S. M. Hamberger, L. E. Sharp, and L. F. Petersen. Jun 79, 4p
U.S. Sales Only.

Although stellarators offer some considerable advantages over tokamaks, difficulties arise in designing large devices due, for instance, to poor plasma access as well as to constructional electromechanical and maintenance problems associated with continous helical windings. This paper describes a design for a fairly large device (major radius 2.1m), based on a set of discrete coil modules arranged in a toroidal configuration to provide the required closed magnetic surfaces, having gaps for unobstructed access to the plasma for diagnostics, etc, and allowing for easy removal for maintenance. (Atomindex citation 11:498026)

ANU-PRL-2/79 PC **A02**/MF **A01**
Australian National Univ., Canberra. Plasma Research Lab.
Optimization of a Stellarator Design Including Modulation of the Helical Winding Geometry.
L. E. Sharp, L. F. Petersen, and J. W. Blamey. Jun 79, 4p
U.S. Sales Only.

The optimization of the helical winding geometry of the next generation of high performance stellarators is of critical importance as the current in the helical conductors must be kept to a minimum to reduce the very large electromechanical forces on the conductors. Using a modified version of the Culham computer code MAGBAT, steps towards optimization are described. (Atomindex citation 11:498103)

CONF-791102-156 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Large Aspect Ratio Tokamak Study.
R. L. Reid, J. A. Holmes, W. A. Houlberg, Y. K. M. Peng, and D. J. Strickler. 1979, 6p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Large Aspect Ratio Tokamak Study (LARTS) investigated the potential for producing a viable long burn tokamak reactor through enhanced volt-second capability of the ohmic heating transformer by employing high aspect ratio designs. The plasma physics, engineering, and economic implications of high aspect ratio tokamaks were accessed in the context of extended burn operation. Plasma startup and burn parameters were addressed using a one-dimensional transport code. The pulsed electrical power requirements for the poloidal field system, which have a major impact on reactor economics, were minimized by optimizing the field in the ohmic heating coil and the wave shape of the ohmic heating discharge. A high aspect ratio reference reactor was chosen and configured. (ERA citation 05:023332)

CONF-791102-157 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Lifetime Estimates of a Fusion Reactor First Wall by Linear Damage Summation and Strain Range Partitioning Methods.
K. C. Liu, and M. L. Grossbeck. 1979, 5p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A generalized model of a first wall made of 20% cold-worked steel was examined for neutron wall loadings ranging from 2 to 5 MW/m exp 2 . A spectrum of simplified on-off duty cycles was assumed with a 95% burn time. Independent evaluations of cyclic lifetimes were based on two methods: the method of linear damage summation currently being employed for use in ASME high-temperature design Code Case N-47 and that of strain range partitioning being studied for inclusion in the design code. An important point is that the latter method can incorporate a known decrease in ductility for materials subject to irradiation as a parameter, so low-cycle fatigue behavior can be estimated for irradiated material. Lifetimes predicted by the two methods agree reasonably well despite their diversity in concept. Lack of high-cycle fatigue data for the material tested at temperatures within the range of our interest precludes making conclusions on the accuracy of the predicted re-

sults, but such data are forthcoming. The analysis includes stress relaxation due to thermal and irradiation-induced creep. Reduced ductility values from irradiations that simulate the environment of the first wall of a fusion reactor were used to estimate the lifetime of the first wall under irradiation. These results indicate that 20% cold-worked type 316 stainless steel could be used as a first-wall material meeting a 8 to 10 MW-year/m exp 2 lifetime goal for a neutron wall loading of about 2 MW-year/m exp 2 and a maximum temperature of about 500 exp 0 C. (ERA citation 05:022687)

CONF-791102-161 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Development of the Ion Source for PDX Neutral Beam Injection.
M. M. Menon, C. C. Tsai, W. L. Gardner, G. C. Barber, and H. H. Haselton. 1979, 12p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The paper describes the development of the ion source for neutral beam injection heating of PDX plasma. After a brief description of the plasma generator, the performance characteristics of the source, with different types of grids, are described. Based on test stand results it is concluded that at least two different versions of the source should be able to meet and even exceed the neutral power and energy requirements expected out of PDX injectors. (ERA citation 05:025063)

CONF-791102-163 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of the Impact of a Committed Site on Fusion Reactor Development.
R. L. Reid, and A. Nagy. 1979, 4p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The technical and economic merits of a committed fusion site for development of tokamak, mirror, and EBT reactor from ignition through demo phases were evaluated. Schedule compression resulting from evolving several reactor concepts and/or phases on a committed site as opposed to sequential use of independent sites was estimated. Land, water, and electrical power requirements for a committed fusion site were determined. A conceptual plot plan for siting three fusion reactors on a committed site was configured. Reactor support equipment common to the various concepts was identified as candidates for sharing. Licensing issues for fusion plants were briefly addressed. (ERA citation 05:025044)

CONF-791102-165 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Calorimeter for Pulsed Energy Sources.
J. W. Pearce, and P. H. Edmonds. 1979, 3p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A common problem in plasma physics experiments is the measurement of the energy deposited on a water-cooled plate by a pulsed energy source. Examples of this are neutral-beam-line defining plate and targets and tokamak water-cooled limiters. One method of measuring this energy is to integrate the product of the temperature rise (delta T) and the flow rate (F) of the coolant over the interval between the pulses. The two input parameters delta T and F are derived from a differential thermopile and a turbine flow meter, respectively. A simple digital readout circuit displays the deposited energy in a light-emitting diode display. The circuit uses a commercially available, dual-slope analog-to-digital converter (ADC) in a novel configuration that multiplies delta T and F directly. Calibration of the readout circuit is quick and simple, and short-term accuracies of 5% are easily obtained. Over longer periods the accuracy becomes degraded, primarily by thermal drifts in the thermopile amplifier and in the thermopile connections and the wiring. This offset must be compensated for by a simple adjustment before each experimental run. This readout circuit has been used successfully on the Impurity Study Experiment (ISX-B) neutral beam lines and is most convenient for deposited energy measurements in applications in which computerized data acquisition is not available. (ERA citation 05:025086)

CONF-791102-168 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Stresses in Liquid Lithium Modules in a Tokamak Blanket Due to a Changing Poloidal Magnetic Field.
J. S. Walker, and W. M. Wells. 1979, 5p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

For a fusion reactor blanket that contains molten lithium or lithium alloys, forces will arise when the magnetic field is changed and cause pressures in the lithium and stresses in the containment vessels. Previous analyses of this problem assume improperly that the conductive fluid is static. For the present analysis, the conductive liquid is contained in a thin-walled cylinder with a constant (toroidal) magnetic field perpendicular to the cylinder axis and with a time-varying (poloidal) magnetic field perpendicular to the toroidal field. The variables in the liquid are governed by the equations of magnetohydrodynamics and are coupled to the electric current and voltage in the cylinder wall, which are governed by Maxwell's equation and Ohm's law. Formulas are derived for the stresses in the cylinder wall caused by bending moment, torsion, shearing, and ring bending that result from the pressure and viscous shear force on the inside surface of the cylinder and from the electromagnetic body force in the cylinder wall. These formulas are used to calculate the module stresses for the design arrived at in the Oak Ridge National Laboratory (ORNL)/Westinghouse Demonstration (DEMO) Reactor Study. (ERA citation 05:025062)

CONF-791103-94 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
ISX Objectives and Physics.
J. T. Mihalczo. 1979, 6p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The ISX-B program has achieved average beta values of 1.8% in a relatively clean plasma with neutral beam injection power greater than 10 times ohmic power input. Total beta has increased smoothly with beam power so far and exceeded theoretical limits with no indication that ballooning or any other instability is significantly increasing the energy loss rate. (ERA citation 05:023345)

CONF-791204-34 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Concept Evaluation of Nuclear Fusion Driven Symbiotic Energy Systems.
J. P. Renier, and T. J. Hoffman. 1979, 32p
Contract W-7405-ENG-26
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

This paper analyzes systems based on D-T and semi-catalyzed D-D fusion-powered U233 breeders. Two different blanket types were used: metallic thorium pebble-bed blankets with a batch reprocessing mode and a molten salt blanket with online continuous or batch reprocessing. All fusion-driven blankets are assumed to have spherical geometries, with a 85% closure. Neutronics depletion calculations were performed with a revised version of the discrete ordinates code XSDRN-PM, using multigroup (100 neutron, 21 gamma-ray groups) coupled cross-section libraries. These neutronics calculations are coupled with a scenario optimization and cost analysis code. Also, the fusion burn was shaped so as to keep the blanket maximum power density below a preset value, and to improve the performance of the fusion-driven systems. The fusion-driven symbiotes are compared with LMFBR-driven energy systems. The nuclear fission breeders that were used as drivers have parameters characteristic of heterogeneous, oxide LMFBRs. They are net plutonium users - the plutonium is obtained from the discharges of LWRs - and U233 is bred in the fission breeder thorium blankets. The analyses of the symbiotic energy systems were performed at equilibrium, at maximum rate of grid expansion, and for a given nuclear power demand. (ERA citation 05:023361)

CONF-800455-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Energy and Angular Distribution of Low Energy H exp + and D exp + Backscattered from Polycrystalline Carbon.
S. H. Overbury, P. F. Dittner, S. Datz, and R. S. Thoe. 1980, 22p
Contract W-7405-ENG-26
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

The energy distributions of H exp + and D exp + backscattered from a polycrystalline graphite sample were recorded as a function of total scattering angle, angle of incidence, and for incident beam energies 200 < E/sub i/ < 3000 eV. The general shapes of the distributions are discussed qualitatively, and their variation with incident energy and total scattering angle are explained and compared with theoretical and other experimental results. The average energies E exp -+ , of the distributions are found to increase relative to the single scattering energy, E/sub k/, with decreasing incident energy, E exp -+ /E/sub k/ also increases with increasing exit angle from the solid in a way which is slightly dependent upon the angle of incidence. The integrated intensities of the distributions are found to depend strongly upon the angle of incidence, with a normally incident beam producing a nearly cosine distribution of backscattered ions and grazing angles of incidence producing an intensity which peaks at an angle forward of the specular direction. Using charge fractions obtained previously for surface scattering from graphite and transmission through thin carbon foil, values of the particle reflection coefficient R/sub N/ are obtained as a function of energy. (ERA citation 05:022730)

CONF-800455-8 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Initial Testing of Coated Limiters in ISX-B.
R. A. Langley, L. C. Emerson, J. B. Whitley, and A. W. Mullendore. 1980, 19p
Contract W-7405-ENG-26
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

Low-Z coatings on graphite substrates have been developed for testing as limiters in the Impurity Study Experiment (ISX-B) tokamak. Laboratory and tokamak testings have been accomplished. The laboratory tests included thermal shock experiments by means of pulsed e-beam irradiation, arcing experiments, and hydrogen and xenon ion erosion experiments. The tokamak testing consisted of ohmically heated plasma exposures with energy depositions up to 10 kJ/discharge on the limiters. The coatings, applied by chemical vapor deposition, consisted of TiB sub 2 and TiC deposited on POCO graphite substrates. (ERA citation 05:025088)

COO-2218-149 MF **A01**
Illinois Univ., Urbana. Fusion Technology Lab.
Overview of Nonelectrical Applications of Fusion.
G. H. Miley. 1979, 30p CONF-791204-21
Contract EY-76-S-02-2218
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.
Microfiche copies only.

The potential for, and importance of, nonelectrical applications of fusion energy is discussed. Three possibilities are reviewed in some detail: fusion-fission hybrids for fissile fuel production; high-temperature electrolysis and thermochemical processes for hydrogen production; and high-temperature steam for coal gasification. The hybrid could be an early application of fusion if this route is identified as a desirable goal. Hydrogen production and coal gasification processes appear feasible and could be developed as a part of the conventional fusion blanket research and development. The question of economics, particularly in view of the high capital cost of fusion plants, remains an open issue requiring more study. (ERA citation 05:015026)

COO-2218-156 MF **A01**
Illinois Univ. at Urbana-Champaign. Fusion Studies Lab.
Fusion-Product Transport in Axisymmetric Tokamaks: Losses and Thermalization.
L. M. Hively. 1980, 210p

Contract AC02-76ET52040
Thesis.
Microfiche copies only.

High-energy fusion-product losses from an axisymmetric tokamak plasma are studied. Prompt-escape loss fluxes (i.e. prior to slowing down) are calculated including the non-separable dependence of flux as a function of poloidal angle and local angle-of-incidence at the first wall. Fusion-product (fp) thermalization and heating are calculated assuming classical slowing down. The present analytical model describes fast ion orbits and their distribution function in realistic, high- beta , non-circular tokamak equilibria. First-orbit losses, trapping effects, and slowing-down drifts are also treated. (ERA citation 05:021480)

COO-2218-84 PC **A09**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Transport and Effects of High-Energy Charged Fusion-Products in Tokamaks.
P. R. Meka. 1977, 198p
Contract EY-76-S-02-2218
Thesis.

An explicit expression that describes the guiding-center motion of a high-energy charged particle in a lossless, axisymmetric, low-beta (beta less than or equal to 0.1) tokamak has been derived. The expression is valid in any type of toroidal and poloidal field configurations as long as the poloidal flux surfaces, specified by psi (r), are circular. A similar explicit expression is obtained for fields having a vertical stabilizing component, B/sub v/. (ERA citation 05:023335)

DOE/ER-0057 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Assessment of the US Mirror Fusion Program. Report of the 1980 Mirror Senior Review Panel.
Apr 80, 36p

The recommendations of the panel towards the TMX and MFTF experiments and future construction are outlined. (ERA citation 05:023347)

DOE/ET-0065/8 PC **A08**/MF **A01**
Department of Energy, Washington, DC. Office of Fusion Energy.
Damage Analysis and Fundamental Studies. Quarterly Progress Report, October-December 1979.
Feb 80, 172p

Progress on each of the following topics is outlined: (1) rotating target neutron source, (2) fusion materials irradiation test facility, (3) environmental characterization, (4) damage production, and (5) damage microstructure evolution and mechanical behavior. (ERA citation 05:025089)

DOE/ET/53076-1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
Task I. Basic Mirror Studies. Task II. Basic Tokamak Studies. Annual Progress Report.
L. D. Smullin, G. Bekefi, and M. Porkolab. 1979, 14p
Contract AC02-78ET53076

Brief discussions of research progress are given for each of the following areas: (1) building equipment, (2) rf heating, (3) interferometry, (4) gas puffing, (5) mm collective scattering, (6) uv spectroscopy, (7) soft x radiation, (8) charge exchange, and (9) Thomson scattering. (ERA citation 05:023324)

EUR-CEA-FC-932 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Electron Temperature from Cyclotron Emission in T-10 Tokamak.
R. Cano, E. P. Gorbunov, and B. Zanfagna. Dec 77, 20p
U.S. Sales Only.

The electron cyclotron emission perpendicular to the magnetic field at the fundamental and the second harmonic has been calculated for the experimental conditions of the T-10 Tokomak. The conditions for using electron cyclotron emission for electron temperature diagnostic are obtained. The emitted power is compared with the minimum measurable power of the heterodyne receiver and the minimum measurable temperature is determined. Finally the accuracy of this method as well as the spatial resolution in order to obtain the temperature profil is discussed. (Atomindex citation 11:497982)

HEDL-SA-2018-FP MF **A01**
Hanford Engineering Development Lab., Richland, WA.
RTNS-II Utilization.
D. G. Doran, N. F. Panayotou, and R. W. Powell. Dec 79, 17p CONF-800134-1
Contract EY-76-C-14-2170
US-Japan exchange meeting, Argonne, IL, USA, 7 Jan 1980.
Microfiche copies only.

The objective of the several RTNS-II irradation programs is to maximize information gained from the small test volume available in this unique irradiation facility for application in the fusion materials program. While this facility provides the highest 14 MeV neutron flux available, the flux is generally too low and the irradiation volume too small for testing of engineering materials. Emphasis, therefore, is on identifying damage mechanisms of high energy neutrons and correlating them quantitatively with effects produced by fission neutrons. The information gained will be used to evaluate and calibrate damage and correlation models under development. The scope of the program includes in-situ experiments, postirradiation experiments, irradiation temperatures ranging from 4 exp 0 K to 1,000 exp 0 K, and fluences ranging from 3 x 10 exp 16 to about 3 x 10 exp 19 n/cm exp 2 . (ERA citation 05:017270)

IPP-9/28 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Surface Structure and Element Analysis of the Limiter of PULSATOR Tokamak.
H. Kukral. May 79, 14p
In German.
U.S. Sales Only.

The surface structure and the surface composition of a Molybdenum limiter from PULSATOR tokamak have been investigated with a Scanning Electron Microscope (SEM) combined with X-ray microanalysis (XMA). Different surface structures and compositions were observed on the electron drift side and on the ion drift side of the limiter. On the electron side more wall material was found compared to the ion side. (Atomindex citation 11:498060)

IPPJ-360 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Analysis for Extraction and Bunching of Ion Beam from Spherical Reflex Triode.
S. Kawata, T. Abe, K. Kasuya, and K. Niu. Nov 78, 18p
U.S. Sales Only.

Since an ion beam is hoped to impinge on a target in a spherically symmetric way for inertial confinement fusion, an analysis is developed here for the intense ion beam which is extracted from a spherical reflex triode. The basic equations are the Poisson equation for the electric potential and the conservation equations of energies for the ion and electron velocities. According to the asymptotic solution, the extracted ion-beam-current density is proportional to the power of 3/2 of the voltage imposed on the triode. This dependence of the current density on the voltage is improved to be the power of 1.6 by the numerical analysis. A special time-dependence of the ion-beam power at the target surface is required for an optimal implosion of the target. Using the bunching theory for the ion beam, we derive numerically an optimal time-dependence of the voltage imposed on the triode. Asymptotic forms are also obtained analytically for the voltage. (Atomindex citation 11:501047)

IPPJ-372 PC **A04**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Current Density Profile Control by Programming of Gas Puffing and Plasma Current Waveform in the JIPPT-II Tokamak.
K. Toi, S. Itoh, K. Kadota, K. Kawahata, and N. Noda. Mar 79, 66p
U.S. Sales Only.

In the resistive shell tokamak, JIPP T-II, the current density profile control is carried out by pre-programming of both gas puffing and plasma current waveform. The major disruptions are completely suppressed by the method and a high density tokamak plasma with low q(a) is obtained with better MHD stability, where the line-average electron density n sub(e) <= 8.5 x 10 exp 13 cm exp -3 and safety factor at plasma surface q(a) >= 2.2. The control criterion that the current density profile is successfully controlled is derived as a function of the ratio of plasma current to the electron density I sub(p)/n sub(e) in the current rising phase, i.e., 20 x 10 exp -13 <= I sub(p)/n sub(e) <= 30 x 10 exp -13 kA.cm exp 3 . (Atomindex citation 11:501089)

IPPJ-377 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Analysis of Ion Beam Extracted from Reflex Tetrode.
S. Kawata, T. Abe, K. Kasuya, and K. Niu. Mar 79, 18p
U.S. Sales Only.

It is shown that the ion beam is forced to move from the anode toward the virtual cathode in a reflex tetrode which is made on the basis of a new idea that the plasma source is separated from the anode. The expressions are derived for the ion-beam current densities which are extracted from reflex tetrodes. We consider the two types of tetrodes, of which one has the ion source and the other has the plasma source. The analyses are given for the three kinds of geometries, plane, cylindrical and spherical. (Atomindex citation 11:501048)

IPPJ-379 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Modular Systems for Producing Toroidal Stellarator Fields.
K. Matsuoka, K. Kawahata, and K. Miyamoto. Mar 79, 24p
U.S. Sales Only.

Numerical studies are made on magnetic properties of toroidal modular systems for producing a stellarator field. For the system using saddle coils, rotational transform and magnetic well are improved by making use of sectorial coils. In the l = 2 stellarator using a typical sectorial coil, almost same values of iota and magnetic well as those by helical winding are produced, when the coil current in the equivalent helical path is 2 times of that of helical winding. Good accessibility is possible by shift or tilting of saddle coils without giving serious disturbances to magnetic surfaces. This modular system for an l = 3 stellarator is also studied. The sectorial coil is also effective on improvement of rotational transform and magnetic well in a stellarator using modified version of a twisted coil. (Atomindex citation 11:501060)

JAERI-M-7869 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Cryopump of 60,000 L/Sec for Hydrogen Gas.
T. Shibata, Y. Okumura, and J. Sakuraba. Sep 78, 18p
In Japanese.
U.S. Sales Only.

In neutral beam injection for the JT-60, the condensation cryopumps of 10 exp 6 l/sec for hydrogen will be used. In development of the cryopumps a small scale cryopump of 60,000 l/sec has been constructed following on that of 12,000 l/sec. It consists of a pair of liquid-helium cooled panels (60 cm x 60 cm), liquid-nitrogen cooled chevrons and radiation shields. The measured pumping speed agrees with the design one and after condensation of 13 Torr.l/cm exp 2 no drop in the pumping speed is observed. The rate of liquid helium consumption was obtained and the sources of heat loading to the cryopanels were investigated. The heat loading due to hydrogen gas in particular is 0.12 +- 0.02 J/Torr.l, which is explainable by the energy difference of normal hydrogen between 80 K and 4.2 K; this energy difference is not internal energy nor enthalpy. (Atomindex citation 11:501080)

JAERI-M-8059 PC **A13**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.

Annual Report of the Division of Thermonuclear Fusion Research and the Division of Large Tokamak Development for the Period of April 1, 1977 to March 31, 1978.
Feb 79, 280p
U.S. Sales Only.

Research and development works in fiscal year 1977 of the Division of Thermonuclear Fusion Research and the Division of Large Tokamak Development are described. 1) Theoretical studies on tokamak confinement have continued with more emphasis on computations. A task was started of developing a computer code system for mhd behavior of tokamak plasmas. 2) Experimental studies of lower hybrid heating up to 140 kW were made in JFT-2. The ion temperature was increased by 50% -- 60% near the plasma center. Plasma-wall interactions (particle and thermal fluxes to the wall, and titanium gettering) were studied. In JFT-2a (DIVA) ion sputtering, arcing and evaporation were identified, and the impurity ion sputtering was found to be a dominant origin of metal impurities in the present tokamaks. High temperature and high-density plasma divertor actions were demonstrated; i.e. the divertor decreases the radiation power loss by a factor of 3 and increases the energy confinement time by a factor of 2.5. Various diagnostic instruments operated sufficiently to provide useful information for the research with JFT-2 and JFT-2a(DIVA). 3) JFT-2 and JFT-2a(DIVA) operated as scheduled. Technological improvements were made such as titanium coating of the chamber wall, discharge cleaning and pre-ionization. 4) Detailed design of the prototype JT-60 neutral beam injector was made. A 200 kW, 650 MHz radiofrequency heating system for JFT-2 was completed; a lower hybrid heating experiment in JFT-2 was successful 5) In particle-surface interactions, the sputtering and surface erosion were studied. 6) Improvement designs of a superconducting cluster test facility and a test module coil were made in the toroidal coil development. 7) Second preliminary design of the tokamak experimental fusion reactor JXFR started in April 1977. Safety analyses were made of the main components and system of JXFR on the basis of the first preliminary design. (Atomindex citation 11:501041)

JAERI-M-8088 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Source Plasma Study of the DuoPIGatron Ion Source for JT-60 Neutral Beam Injector.
Y. Arakawa, M. Akiba, U. Kondoh, S. Matsuda, and T. Ohga. Feb 79, 22p
U.S. Sales Only.

In an effort to develop a plasma source capable of producing a dense, uniform, and quiescent plasma for JT-60 neutral beam injectors, experimental studies on duoPIGatron ion sources have been pursued. In the 15 cm axisymmetric duoPIGatron ion source, the ion current density is about 250 mA/cm exp 2 , uniform to +-10% over the extraction grid. In the rectangular duoPIGatron source, the ion current is 190 mA/cm exp 2 , uniform to +-5% over the area of 8 cm by 24 cm. By measuring potential distributions of the source plasma, we have found the fact that copper buttons located at downstream of the intermediate electrode play an important role in raising the density level, gas efficiency, and arc efficiency as well as in improving the plasma uniformity. (Atomindex citation 11:500986)

JAERI-M-8155 PC **A08**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Seismic Analysis of the JT-60, (1). Analysis Method and Eigenvalue Analysis.
H. Takatsu, M. Shimizu, M. Okumura, and M. Kawakami. Mar 79, 159p
In Japanese.
U.S. Sales Only.

Seismic analysis of JT-60, a tokamak machine under construction in JAERI, was carried out in order to confirm machine integrity in earthquakes in connection with any aseismic design changes. Described are an analysis method newly developed for seismic analysis of JT-60 and the results of eigenvalue analysis of the machine. For analysis, the machine model comprises "simple models" of respective components constituting the machine. Each simple model is based on the engineering criterion that it should have as similar dynamic characteristics to those of a "detailed model", which is faithful to the real component structure and further as few nodal points as possible. So, analysis of the machine model gives information of not only overall behavior of the machine but also local vibration of each component with few nodal points. The analysis method is thus useful especially for large complex structures such as JT-60. The method was applied to JT-60; the machine model with about 800 nodal points is constructed of simple models of respective components having eigenmodes and frequencies similar to those of the detailed models up to the 10th mode. Eigenvalue analysis of the machine model showed that JT-60 has the 1st natural frequency of 4.5 Hz and distinguished horizontal vibration mode of the vacuum vessel (40 exp 0 sector); which indicates the necessity of design change of the support structure of the vacuum vessel. (Atomindex citation 11:501086)

JAERI-M-8215 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Divertor Experiment for Impurity Control in DIVA.
M. Nagami. Apr 79, 94p
U.S. Sales Only.

Divertor actions of controlling the impurities and the transport of impurity ions in the plasma have been investigated in the DIVA device. Following are the results: (1) The radial transport of impurity ions is not described only by neoclassical theory, but it is strongly influenced by anomalous process. Radial diffusion of impurity ions across the whole minor radius is well described by a neoclassical diffusion superposed by the anomalous diffusion for protons. Due to this anomalous process, which spreads the radial density profile of impurity ions, 80 to 90% of the impurity flux in the plasma outer edge is shielded even in a nondiverted discharge. (2) The divertor reduces the impurity flux entering the main plasma by a factor of 2 to 4. The impurity ions shielded by the scrape-off plasma are rapidly guided into the burial chamber with a poloidal excursion time roughly equal to that of the scrape-off plasma. (3) The divertor reduces the impurity ion flux onto the main vacuum chamber by guiding the impurity ions diffusing from the main plasma into the burial chamber, thereby reducing the plasma-wall interaction caused by diffusing impurity ions at the main vacuum chamber. The impurity ions produced in the burial chamber may flow back to the main plasma through the scrape-off layer. However, roughly only 0.3% of the impurity flux into the scrape-off plasma in the burial chamber penetrates into the main plasma due to the impurity backflow. (4) A slight cooling of the scrape-off plasma with light-impurity injection effectively reduces the metal impurity production at the first wall by reducing the potential difference between the plasma and the wall, thereby reducing the accumulation of the metal impurity in the discharge. Radiation cooling by low-Z impurities in the plasma outer edge, which may become an important feature in future large tokamaks both with and without divertor, is numerically evaluated for carbon, oxygen and neon. (Atomindex citation 11:501069)

LA-UR-80-1104 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Production of Field-Reversed Configurations with a Magnetized Coaxial Plasma Gun.
T. R. Jarboe, I. Henins, H. W. Hoida, R. K. Linford, and J. Marshall. 1980, 10p CONF-800441-5
Contract W-7405-ENG-36
International symposium on physics and open-ended fusion systems, Tsukuba, Japan, 15 Apr 1980.

Compact toroids were generated which can be made to come to rest in a cylindrical resistive flux conserver. They are observed to rotate so that their major axis is perpendicular to the axis of the flux conserver. Subsequently they appear to remain stationary and decay with a time constant of about 100 mu s. We have also generated compact toroids in an oblate geometry which remain aligned with the axis of the flux conserver and decay with a time constant of 150 mu s. The magnetic field reconnection time for compact toroid formation is measured in the latter case to be much shorter than the decay time. (ERA citation 05:025049)

LA-UR-80-1167 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Flux at a Point in MCNP.
E. D. Cashwell, and R. G. Schrandt. 1980, 14p CONF-800471-2
Contract W-7405-ENG-36
Seminar on theory and applications of Monte Carlo methods, Oak Ridge, TN, USA, Apr 1980.

The current state of the art of calculating flux at a point with MCNP is discussed. Various techniques are touched upon, but the main emphasis is on the fast improved version of the once-more-collided flux estimator, which has been modified to treat neutrons thermalized by the free gas model. The method is tested on several problems on interest and the results are presented. (ERA citation 05:023378)

LA-UR-80-1203 MF **A01**
Los Alamos Scientific Lab., NM.
Design and Construction of the Tritium Systems Test Assembly.
J. L. Anderson. 1980, 7p CONF-800427-6
Contract W-7405-ENG-36
Tritium technology in fission, fusion, and isotopic application, Dayton, OH, USA, 29 Apr 1980.
Microfiche copies only.

The objective of TSTA is to develop those aspects of tritium technology related to the fuel cycle for fusion power reactors and to develop the environmental and personnel safety systems required for such a tritium facility. The TSTA schedule calls for construction to be completed and the facility to be operational by the end of FY-1981. The project is now somewhat more than halfway through the design-construction phase and is currently on schedule for the 1981 operational milestone. In this paper the current status of the major subsystems will be discussed. The subsystems to be discussed include the: Vacuum Facility; Fuel Cleanup; Isotope Separation; Transfer Pump; Emergency Tritium Cleanup; Tritium Waste Treatment; Tritium Monitoring; Secondary Containment; and, the Master Data Acquisition and Control System. (ERA citation 05:025067)

LA-UR-80-1249 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Preliminary Analysis of the Safety and Environmental Impact of the Tritium Systems Test Assembly.
R. V. Carlson, and R. A. Jalbert. 1980, 7p CONF-800427-7
Contract W-7405-ENG-36
Tritium technology in fission, fusion, and isotopic application, Dayton, OH, USA, 29 Apr 1980.

The Tritium Systems Test Assembly (TSTA) is a facility dedicated to the development of technologies associated with the D-T fuel cycle of future fusion reactors while demonstrating that TSTA can be operated safely with no significant losses to the environment. During the initial design stage of TSTA, a safety analysis was performed which investigated the effects of major subsystem component failure, the meteorology and seismicity of the site and their possible effect on the facility, and accident scenarios which result in tritium releases. Major releases of tritium to the environment are considered highly improbable since they require a compound failure of primary and secondary containment, along with either a breach of the building or a failure of the Emergency Tritium Cleanup system. Accidental releases caused by natural phenomena (earthquake, tornado, etc.) are considered highly improbable (< 10 exp -0 /yr). (ERA citation 05:025068)

LA-UR-80-1273 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Fuel Cleanup System for the Tritium Systems Test Assembly: Design and Experiments.
E. C. Kerr, J. R. Bartlit, and R. H. Sherman. 1980, 4p CONF-800427-8
Contract W-7405-ENG-36
Tritium technology in fission, fusion, and isotopic application, Dayton, OH, USA, 29 Apr 1980.

A major subsystem of the Tritium Systems Test Assembly is the Fuel Cleanup System (FCU) whose functons are to: (1) remove impurities in the form of argon and tritiated methane, water, and ammonia from the reactor exhaust stream and (2)

recover tritium for reuse from the tritiated impurities. To do this, a hybrid cleanup system has been designed which utilizes and will test concurrently two differing technologies - one based on disposable, hot metal (U and Ti) getter beds and a second based on regenerable cryogenic asdorption beds followed by catalytic oxidation of impurities to DTO and stackable gases and freezout of the resultant DTO to recover essentially all tritium for reuse. (ERA citation 05:025069)

NRL-MR-4167 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Accurate Analytic Approximations and Numerical Solutions for the Structure of Quasi-Static Laser Driven Ablation Layers.
J. H. Orens. 29 Feb 80, 23p
Contract ES-77-A-01-6021

Time dependent simulations of a laser driven accelerating shell and ablation layer have shown the presence of long lived quasi-static density and pressure profiles. This paper models the equilibrium solutions for a laser ablation layer both analytically and numerically and develops a detailed understanding of the nature of this flow. Such a model enables the calculation of the quantitative dependence of the shell thickness and acceleration, the peak density, velocity, and temperature of the shell, the width of the Rayleigh-Taylor region, and the distance to the critical surface on the total plasma mass, the critical density, and the absorbed and reflected laser flow. (ERA citation 05:023370)

N80-26272/8 PC **A04**/MF **A01**
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Schlieren Diagnostics of a Hypersonic Gas Target Neutron Generator.
A. A. Haasz, and J. H. Lever. Feb 80, 71p
UTIAS-242, ISSN-0082-5255
Sponsored by National Science and English Research Council of Canada.

The gasdynamic behavior of a planar model of the Los Alamos geometry hypersonic Gas Target Neutron Generator (GTNG) was investigated using Schlieren flow visualization photographs, static and total pressure and spill flow measurements. The model consisted of two symmetrical expansion nozzles with 220 microns throats producing a combined flow of about Mach 4 in the GTNG channel. Stagnation pressures of 100-800 kPa were used. Two basic flow configurations, spill line closed and spill line open, were studied in order to gain insight into the complex boundary layer development near the nozzle exit planes. Both flow configurations are discussed qualitatively, making use of the pressure measurements and theoretical analysis.

ORNL/TM-6733 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
ETF Mission Statement Document. ETF Design Center Team.
Apr 80, 149p
Contract W-7405-ENG-26

The Mission Statement document describes the results, activities, and processes used in preparing the Mission Statement, facility characteristics, and operating goals for the Engineering Test Facility (ETF). Approximately 100 engineers and scientists from throughout the US fusion program spent three days at the Knoxville Mission Workshop defining the requirements that should be met by the ETF during its operating life. Seven groups were selected to consider one major category each of design and operation concerns. Each group prepared the findings of the assigned area as described in the major sections of this document. The results of the operations discussed must provide the data, knowledge, experience, and confidence to continue to the next steps beyond the ETF in making fusion power a viable energy option. The results from the ETF mission (operations are assumed to start early in the 1990's) are to bridge the gap between the base of magnetic fusion knowledge at the start of operations and that required to design the EPR/DEMO devices. (ERA citation 05:023348)

PB80-809320 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Delphi Method Used in Forecasting. 1970-April, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 79,
C. Gilbert Young. May 80, 69p
Sponsored in part by National Technical Information Service, Springfield, VA.

The Delphi Method as used in forecasting, arriving at a consensus, or in polling opinion, for a large range of questions, is described in this ten-year retrospective survey. Modifications of the basic approach, analyses of the validity of the results, and suggestions for improvements, are included. (Contains 74 citations)

PB80-813546 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Controlled Fusion Reactor Design and Technology-Tokamak Devices. 1977-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1977-Jul 80,
Samuel C. Mauk. Aug 80, 88p
Supersedes NTIS/PS-79/0811. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns aspects of controlled fusion reactor design and technology as applied to Tokamak devices. Included are articles concerning plasma control, plasma heating, toroidal plasmas, neutral beams, magnetic field configuration, superconducting magnets, magnetohydrodynamic stability, field coils, and magnetic coils. Articles covering Tokamak reactor design and technology are stressed. (This updated bibliography contains 335 citations, 99 of which are new entries to the previous edition.)

PPPL-1653 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Microturbulence in the PLT Tokamak.
E. Mazzucato. Apr 80, 19p
Contract EY-76-C-02-3073

By heterodyne detection of scattered microwaves, density fluctuations have been observed in the PLT tokamak in the range of wavelengths 0.2-2 cm and with frequencies up to 200 to 300 kHz. The flux of runaway electrons onto the limiter was modulated in the same range of frequencies. The level of turbulence was enhanced by the injection of energetic neutrals; and for ion temperatures in excess of 4 keV, a new type of oscillation was observed. (ERA citation 05:023330)

SAND-79-2105C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Testing of Low Z Coated Limiters in Tokamak Fusion Devices.
J. B. Whitely, A. W. Mullendore, and R. A. Langley. 1980, 20p CONF-800439-3
Contract EY-76-C-04-0789
International conference on metallurgical coatings, San Diego, CA, USA, 21 Apr 1980.

Extensive testing on a laboratory scale has been used to select those coatings most suitable for this environment. From this testing which included pulsed electron beam heating, low energy ion bombardment and arcing, chemical vapor deposited coating of TiB sub 2 and TiC on Poco graphite substrates have been selected and tested as limiters in ISX. Both limiter materials gave clean, stable, reproducible tokamak discharges the first day of operation. After one weeks exposure, the TiC limiter showed only superficial damage with no coating failure. The TiB sub 2 limiter had some small areas of coating failure. TiC coated graphite limiters have also been briefly tested in the tokamaks Alcator and PDX with favorable results. (ERA citation 05:025092)

SAND-79-2409C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development and Laboratory Testing of Low Z Refractory Coatings for Fusion Reactor Limiters.
A. W. Mullendore, J. B. Whitley, and D. M. Mattox. 1980, 19p CONF-800455-6
Contract EY-76-C-04-0789
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

A materials development program for low Z (Z < 24) coated tokamak limiters is described. A variety of refractory coatings applied by chemical vapor deposition, plasma spraying and chemical conversion to graphite and copper substrates have been evaluated. The results of laboratory testing for low energy hydrogen ion erosion, arc erosion and thermal fatigue by pulsed electron beam heating are reported. The 250 V hydrogen ion erosion data, analysed in terms of the effect of plasma radiation losses from resultant contaminants, indicates near equivalence of the very low Z (B and B sub 4 C e.g.) and the moderate Z (e.g., TiB sub 2) coatings. Thermal fatigue testing has identified several candidate materials which can survice 1000, 3 kJ / cm exp 2 pulses of electron beam heating. The development of prototype limiters of TiB sub 2 , TiC and B coated graphite for testing in the ORNL ISX-B tokamak is described. (ERA citation 05:025093)

UCID-18614 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Adiabatic Compression of Field-Reversed Plasma.
J. W. Shearer. 28 Apr 80, 20p
Contract W-7405-ENG-48

Field-reversed plasma compression occurs in a number of different contexts. Theta pinches are compressed by a time-increasing magnetic field, produced either by a large power supply or by a moving conductor (liner). A moving field-reversed plasma that encounters an increasing magnetic mirror field also experiences compression due to the increase in the local field as seen by the plasma. This interaction occurs at the entrance to the moving ring reactor and in the BETA-II plasma ring injection experiment. The adiabatic compression of the moving ring is considered by means of some dimensional scaling rules. (ERA citation 05:025050)

UCRL-15219 PC **A06**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Conceptual Design Study of the Hylife Lithium Fall Laser Fusion Chamber. FY 1979 Annual Report.
30 Nov 79, 123p
Contract W-7405-ENG-48

In FY 1979, the basic configuration of FY 1978 was used as a reference point. Many studies were then made to either generate more design information concerning this design or to produce new concepts that would lead to a superior configuration. Among these activities were a detailed weight analysis, an assembly sequence, a chamber vibration analysis, a splash baffle stress study, and an analysis of first wall thermal stresses. Then some new concepts were introduced that pertained to the first wall, the lithium inlet nozzle, the chamber supports, the inlet piping, and pressure vessel. (ERA citation 05:023373)

UCRL-52922 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Use of Coaxial Plasma Guns to Start Up Field-Reversed-Mirror Reactors.
A. C. Smith, Jr., G. A. Carlson, J. L. Eddleman, C. W. Hartman, and W. S. Neef, Jr. 19 Mar 80, 18p
Contract W-7405-ENG-48

Application of a magnetized coaxial plasma gun for start-up of a field-reversed-mirror reactor is considered. The design is based on preliminary scaling laws and is compared to the design of the start-up gun used in the Beta II experiment. (ERA citation 05:023366)

UCRL-52923 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Neutron Yield Measurements on a TMX Endplug.
D. R. Slaughter. 17 Mar 80, 16p
Contract W-7405-ENG-48

Neutron yield measurements were made on the east endplug of TMX using a calibrated recoil

proton counter. The detector consists of a liquid scintillator (NE 213) with a pulse shape discrimination property that allows for identifying photon and neutron interactions. An energy threshold is established to suppress the response to scattered neutrons with energies lower than 1 to 2 MeV. Results indicate there are typical neutron yields of 2 to 3 x 10 exp 11 n/s during a 25-ms discharge with 200 A of 20-keV neutral beam injection into the endplug. (ERA citation 05:025005)

UCRL-82993 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
CAMAC Serial Highway Interface for the LSI-11.
N. H. Lau. 3 Apr 80, 9p CONF-800464-1
Contract W-7405-ENG-48
DECUS conference, Anaheim, CA, USA, 19 Apr 1980.

A CAMAC Serial Highway Interface has been designed for the Local Control and Instrumentation System of the Mirror Fusion Test Facility. There are over 50 distinguishable systems in the facility, each of which consists of the LSI-11 computer, fiber optic communication links, and the CAMAC system. The LSI-11 computer includes a 32k memory, serial modem interface and the CAMAC Serial Highway Interface. (ERA citation 05:023379)

UCRL-83470 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Target Factory in Perspective.
J. W. Sherohman, and C. D. Hendricks. 11 Apr 80, 6p CONF-800208-13
Contract W-7405-ENG-48
Tropical meeting on inertial confinement fusion, San Diego, CA, USA, 26 Feb 1980.

A target factory diagram has been constructed for an analysis of the shell coating process system in relation to target production. The number of deposition units needed to achieve the coating requirements will be a major target production operating cost. (ERA citation 05:021910)

UCRL-83607 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Gas Control and Wall Conditioning in TMX.
R. P. Drake, G. Deis, M. Richardson, and T. C. Simonen. Apr 80, 19p CONF-800455-3
Contract W-7405-ENG-48
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

The Tandem Mirror Experiment (TMX) is a magnetic fusion research device at the Lawrence Livermore Laboratory, which confines a center-cell plasma between two higher density end-plug plasmas. The end-plug plasmas are separated from the metal end walls by an end-fan chamber. This paper describes how to minimize the power lost through charge-exchange and electron conduction. To isolate the end-plug plasma from the end wall, wall conditioning, gas pumping, and magnetic-field expansion are used in the end-fan chamber. The plasma density is reduced from above 10 exp 13 cm exp -3 in the end-plug to well below 10 exp 10 cm exp -3 at the end wall. A peak plasma potential of more than 1 kV above the grounded end wall is maintained in steady-state and gas buildup near the end wall is avoided. Gas flow in the end plug is controlled and the end-plug walls are conditioned so that the end-plug plasma is not eroded by large fluxes of cold gas. Wall conditioning in the center cell provides reproducible conditions. The center cell is fueled by gas from a gas box or a pulsed valve. (ERA citation 05:023319)

UCRL-84115(Rev.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Materials at Extreme Conditions: ICF Targets.
R. M. More. 7 Apr 80, 45p CONF-800317-3
Contract W-7405-ENG-48
American Physical Society meeting, New York, NY, USA, 24 Mar 1980.

Currently two simple theories are heavily used in laser-fusion research: the Thomas-Fermi-Dirac statistical model, and an atomic ionization model based on screened hydrogen like energy levels. Recent improvements in these theories are summarized. We show representation calculations of thermodynamic properties, ionization, x-ray emission rates and fast-ion stopping powers, and give a brief sketch of the major unresolved scientific questions. (ERA citation 05:023375)

UCRL-84221 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Initial Results of the Tandem Mirror Experiment (TMX) At the Lawrence Livermore Laboratory.
D. P. Grubb, C. A. Anderson, T. A. Casper, J. F. Clauser, and F. H. Coensgen. 2 Apr 80, 10p CONF-800409-5
Contract W-7405-ENG-48
International conference on plasma physics, Nagoya, Japan, 7 Apr 1980.

Initial experimental results from the Tandem Mirror Experiment (TMX) are presented. Axial profiles of the plasma density and potential necessary for electrostatically enhanced confinement of the central-cell ions have been generated and sustained for the duration of neutral-beam injection. The resulting central-cell ion confinement against axial loss is improved by a factor as large as 9 above that given by magnetic confinement alone. The plasma exhibits gross magnetohydrodynamic stability and microstability. Under some conditions, a residual level of ion cyclotron fluctuations in the end cells heats the central-cell ions and degrades their confinement. (ERA citation 05:025006)

UCRL-84302 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Dynamical Determination of Ohmic States of a Cylindrical Pinch.
D. D. Schnack. Apr 80, 6p
Contract W-7405-ENG-48

The dual problems of generation and sustainment of the reversed axial field are studied. It is shown that, if a cylindrical plasma is initially in an axisymmetric state with a sufficient degree of paramagnetism, field reversal can be attained by mode activity of a single helicity. The initial paramagnetism may be due to the method of pinch formation, as in fast experiments, or to a gradual altering of the pitch profile resulting from a succession of instabilities. Furthermore, if the total current is kept constant and energy loss and resistivity profiles are included in an ad hoc manner, one finds that the final steady state of the helical instability can be maintained for long times against resistive diffusion without the need for further unstable activity. These states, which possess zero order flow and possibly reversed axial field, represent steady equilibria which simultaneously satisfy force balance and Ohm's law, and are termed Ohmic states. (ERA citation 05:023358)

18B. Isotopes

ANL/BIM-72-3 PC **A07**/MF **A01**
Argonne National Lab., IL.
Principles of Radiotracer Methodology.
W. E. Kisieleski. Jun 75, 145p
Contract W-31-109-ENG-38

Information is presented on the properties of radioisotopes and radiations, methods and equipment for radiation detection, safety in handling radioactive materials, the biological effects of radiation, and the design of radiotracer studies. (ERA citation 05:021911)

CONF-791049-25 MF **A01**
Oak Ridge National Lab., TN.
Development of Resin-Bead Isotope-Dilution Mass Spectrometric Techniques for Tc-99 Analysis.
R. L. Walker. 1979, 11p
Contract W-7405-ENG-26
23. conference on analytical chemistry in energy technology, Gatlinburg, TN, USA, 9 Oct 1979.
Microfiche copies only.

An isotope dilution mass spectrometric method was developed for the analysis of Tc-99 after isolating it onto anion exchange resin beads. A single resin bead containing Tc-99 and Tc-97 spike is loaded onto a rhenium V-shaped filament for thermal emission mass spectrometry. The application of this technique requires the use of a mass spectrometer of high abundance sensitivity and pulse counting capability for the necessary ion detection sensitivity. This paper discusses the development of the technique, including the mass spectrometer, choice of filament material, scanning modes, interferences, and present achievable sample sensitivities. (ERA citation 05:020946)

CONF-791103-109 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Current Status of the Transuranium Processing Plant.
L. J. King. 1979, 6p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The current status of the Transuranium Processing Plant (TRU) at Oak Ridge National Laboratory is summarized. The quantities of materials processed in the facility during 12 years of operation are given. TRU, a hot cell chemical processing facility, is described. Provisions have been made for changing and modifying equipment for continued updating of the plant in order to include new concepts in chemical processes and equipment design. (ERA citation 05:021870)

CONF-791117-24 MF **A01**
Oak Ridge National Lab., TN.
Analysis of Plutonium and Uranium by the Resin Bead-Mass Spectrometric Method.
R. L. Walker, and D. H. Smith. 1979, 9p
Contract W-7405-ENG-26
ANS topical conference, Kiawah Island, SC, USA, 26 Nov 1979.
Microfiche copies only.

The development of the resin bead method and the techniques employed in its application to isotopic analysis of Pu and U in highly radioactive solutions of spent reactor fuel will be described. The method, developed primarily for safeguards analyses, may also be applied to isotopic measurement for assessing nuclear fuel cycle technology. Satisfactory analyses of both elements can be obtained from a single resin bead when the initial dissolver solution has a U/Pu ratio in the range of 50 to 300. Optimum bead loadings are 1 to 3 ng Pu and U; these loadings are obtained if the concentration of the solution is adjusted to about 1 mu g U per bead before the beads are introduced. Isotopic composition measurements of NBS standards using this technique indicate a precision of +- 0.5% for minor isotopes in the 1% concentration range and +- 0.1% for major isotopes in the 50% range. Analyses of a synthetic dissolver solution give an accuracy for the isotope dilution measurement of Pu and U of less than or equal to 0.5% with an internal precision of 0.9% and 0.6% for Pu and U, respectively. (ERA citation 05:022746)

JAERI-M-8070 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Determination of Radioactive Iodine Isotopes in the exp 99 Mo Product by Distillation.
H. Kamioki, and K. Hoizumi. Jan 79, 16p
In Japanese.
U.S. Sales Only.

For accurate assay of the radioactive iodine isotopes (exp 131 I, exp 132 I, exp 133 I) in the JAERI exp 99 Mo product, the optimum conditions for distillation of iodine from the sulfuric acid solution containing hydrogen peroxide as an oxidizing agent have been examined. The distillation yield of iodine was influenced by the quantities of potassium iodide used as the carrier, ammonium molybdate and hydrogen peroxide. The distillation yield of iodine under optimum conditions is 99.6 +- 1.3%; exp 99 Mo escaping from the mother liquor in the distillation flask into the trap is less than 10 exp -4 %. The time for complete assay is about 40 min. (Atomindex citation 11:501697)

ORNL/TM-7214 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Stable Isotope Customer List and Summary of Shipments, FY 1979.
W. C. Davis. Apr 80, 36p

Contract W-7405-ENG-26

This compilation is divided into four sections: alphabetical list of customers; alphabetical list of isotopes; alphabetical list of states and countries; and stable isotope sales. (ERA citation 05:021912)

SAND-80-0543C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Overview of Beneficial Uses of Nuclear Fission Products.
J. S. Sivinski. 1980, 6p CONF-800607-21
Contract EY-76-C-04-0789
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Recoverable or reprocessed nuclear wastes as conservable resources with significant potential benefits for use as heat sources, or as radiation sources for industrial, agricultural, and medical applications are reviewed. (ERA citation 05:021913)

18C. Nuclear Explosions

AD-A086 087/4 PC **A03**/MF **A01**
Air Force Weapons Lab Kirtland AFB NM
Airblast Pressure Transducer for Measurements in Nuclear Blast Simulators.
Final rept.,
J. V. Quintana. Apr 80, 33p AFWL-TR-79-59, AD-E200 497

An extremely rugged resistance-based blast pressure transducer is developed over a number of years for use in the blast and shock environment of high explosive-driven nuclear blast simulators. A novel silicon disk with integral (diffused) strain sensitive regions is used as the transduction element for measurements of peaks to 69 MPa and requiring microsecond rise time response. Evolution of the transducer geometry, internal configuration, and special thermal barriers enable sensing applications in extremely violent shock environments to 50 kgs with intense flash and burn thermal environments. A variety of transducer mounting hardware configurations enables side-on sensing of incident overpressure and head-on sensing of reflected and stagnation pressures in a variety of simulator field test configurations.

AD-A086 217/7 PC **A08**/MF **A01**
Physics International Co San Leandro CA
Asymmetric Collapse of LOS Pipe.
Final rept. 28 Feb-31 May 77,
E. T. Moore, Jr., and R. Funston. 17 Jul 79, 153p PIFR-1034, DNA-5023F, AD-E300 820
Contract DNA001-77-C-0155

Laboratory experiments are described that were performed to investigate the potential of using asymmetries to inhibit the formation and progression of high energy jets from the collapse of thin-walled metal tubes. The experiments were designed to simulate the collapse of a line-of-sight (LOS) pipe in an underground nuclear test. Results indicate that helical asymmetries on the internal surface of the tubes may eliminate or suppress jetting. (Author)

AD-A086 218/5 PC **A03**/MF **A01**
California Research and Technology Inc Woodland Hills
Effects of Debris Entrainment and Multi-Phase Flow on Plug Loading in an MX Trench.
Final rept. 1 May-31 Oct 77,
Martin Rosenblatt, Gene E. Carpenter, and Robert P. Bilyeu. 15 Sep 78, 44p CRT-3150F, DNA-4686F, AD-E300 809
Contract DNA001-77-C-0239

The 1 - 1/2-D version of the multi-phase DICE code was used to analyze the flow of hot air and wall debris in covered MX trenches after an on-line burst. In DICE, debris particles are coupled to the air flow by thermal and drag mechanisms. The objective was to examine the effects of major uncertainties in the timing and magnitude of wall removal and debris entrainment upon the pressure and impulse loading on a rigid plug in the trench. The contributions to impulse due both to pressure loading and the momentum of the debris mass were considered. Transfer of momentum and energy from the hot gas flow to the debris attenuates pressures and velocities. In all cases treated, the maximum pressure and impulse calculated on the plug were substantially lower than would be the case if no debris were present (i.e., if the flow in the trench consisted only of hot air). Where debris mass became entrained near the shock (say within 20-50 feet after the shock passes), plug loading was reduced by orders of magnitude. For example, entrainment of the debris from 0.15-in. of wall recession (with entrainment starting 18 feet behind the shock) reduced the maximum pressure on the plug from 6800 to 78 bars and the impulse from 24 to 3 bar-sec (as compared to air-only flow in the trench). Techniques to enhance early entrainment would be useful in reducing the design load on plugs. Debris not entrained until 100 feet or more behind the shock front has a much smaller effect on plug loading.

AD-A086 223/5 PC **A11**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Nuclear Weapon Environment Model. Volume II. Computer Code User's Guide.
Final rept. 19 Jul-31 Dec 78,
R. M. Saqui, T. A. Mazzola, J. R. Hobart, J. D. Gordon, and L. H. Donahue. 1 Feb 79, 226p TRW-34001-6006-RU-00, DNA-4868F-2, AD-E300 810
Contract DNA001-78-C-0340
See also Volume 3, AD-C021 870.

The Nuclear Weapon Environments Model (NWEM) computer code has been developed to calculate launch and aimpoint exclusion contours. This report documents the computer code, its structure, the function and purpose of each subroutine, the definitions of the common block variables, the input and output, the sample problems, and the maintenance and update of the code.

BARC-1023 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
OCENER, A One-Dimensional Computer Code for the Numerical Simulation of the Mechanical Effects of Peaceful Underground Nuclear Explosions in Rocks.
S. C. Gupta, S. K. Sikka, and R. Chidambaram. 1979, 35p
U.S. Sales Only. Microfiche copies only.

An account is given of a one-dimensional spherical symmetric computer code for the numerical simulation of the effects of peaceful underground nuclear explosions in rocks (OCENER). In the code, the nature of the stress field and response of the medium to this field are modelled numerically by finite difference form of the laws of continuum mechanics and the constitutive relations of the rock medium in which the detonation occurs. It enables to approximate well the cavity growth and fracturing of the surrounding rock for contained explosions and the events upto the time the spherical symmetry is valid for cratering-type explosions. (Atomindex citation 11:502779)

18D. Nuclear Instrumentation

AD-A086 076/7 PC **A02**/MF **A01**
Air Force Occupational and Environmental Health Lab Brooks AFB TX
Evaluation of the Energy and Angular Dependence of the Victoreen Models 470A and 471 Survey Meters.
Technical rept.,
Karl L. Prado. 20 Feb 80, 20p Rept no. OEHL-TR-80-8

The angular and energy dependence of the Victoreen models 470A and 471 have been evaluated. The instruments were exposed to x-rays of 9, 21, 42, 64 and 120 keV effective energies as well as to CS-137 gamma rays. Instrument response was also evaluated as a function of incident radiation angle between 0 degrees and 90 degrees. Both instruments met or exceeded manufacturer's performance specifications. (Author)

BNL-27493 PC **A02**/MF **A01**
Institute of Nuclear Research, Warsaw (Poland).
Construction and Operation of an Electromagnetic Shower Detector.
P. H. Garbincius, V. A. Polychronakos, D. S. Barton, T. Dobrowolski, and C. Halliwell. Oct 79, 5p CONF-791037-27
Contract EY-76-C-02-0016
IEEE nuclear science symposium, San Francisco, CA, USA, 17 Oct 1979.

An electromagnetic shower detector consisting of lead glass blocks and scintillator hodoscopes was constructed. During calibration runs detector resolutions were measured for single incident electrons. Performance of the detector for pi exp 0 and multi-photon showers, including sizable backgrounds, was studied during actual data runs. This detector was used in Fermilab Experiment 451. (ERA citation 05:022665)

CONF-7906136-2 MF **A01**
Chicago Univ., IL. Dept. of Radiology.
Conjugate Whole-Body Scanning System for Quantitative Measurement of Organ Distribution in Vivo.
B. M. W. Tsui, C. T. Chen, N. J. Yasillo, C. J. Ortega, and D. B. Charleston. 1979, 26p
Contract EY-76-C-02-0069
26. annual meeting of the Society of Nuclear Medicine, Atlanta, GA, USA, 26 Jun 1979.
Microfiche copies only.

The determination of accurate, quantitative, biokinetic distribution of an internally dispersed radionuclide in humans is important in making realistic radiation absorbed dose estimates, studying biochemical transformations in health and disease, and developing clinical procedures indicative of abnormal functions. In order to collect these data, a whole-body imaging system is required which provides both adequate spatial resolution and some means of absolute quantitation. Based on these considerations, a new whole-body scanning system has been designed and constructed that employs the conjugate counting technique. The conjugate whole-body scanning system provides an efficient and accurate means of collecting absolute quantitative organ distribution data of radioactivity in vivo. (ERA citation 05:016398)

CONF-791037-28 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Comparison of gamma Densitometer Detectors Used in Loss of Coolant Studies.
R. L. Shipp. 1979, 9p
Contract W-7405-ENG-26
IEEE nuclear science symposium, San Francisco, CA, USA, 17 Oct 1979.

Ionization chamber type gamma detectors are used in water-steam density measurements in loss of coolant studies at Oak Ridge National Laboratory. Ionization chambers have replaced current-mode scintillation detectors to obtain stability and freedom from magnetic field interference. However, this change results in some loss of fast transient response. Results of studies comparing the transient response of ionization chamber detectors, plastic scintillation detectors, and sodium iodide (NaI) detectors to rapid changes in gamma intensity demonstrate that plastic scintillation detectors have the fastest response and most closely reproduce the transient; ionization chambers have an initial fast response followed by a slower response, which may produce errors in fast transient measurements; and NaI scintillation detectors have a moderately fast initial response followed by an extremely slow response, which produces errors in even slow transient measurements. (ERA citation 05:022853)

ECN-70 PC **A08**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Nuclear Data Guide for Reactor Neutron Metrology. Part 1. Activation Reactions (1979 Edition).
W. L. Zijp, and J. H. Baard. Aug 79, 161p
U.S. Sales Only.

This document lists numerical data on activation detector materials, on detection reactions involved, and on radionuclides produced. The data are mainly taken from existing evaluations. Where evaluations were missing, unknown or obsolete, data were taken from recent literature. The detection reactions considered were selected on the basis of available information of its use for reactor neutron measurements. To the opinion of the Euratom Working Group on Reactor Dosimetry this document may contribute to the creation of a

common data set for all laboratories working in the field of reactor neutron metrology. It is expected that after one or two years an updated and revised guide will be issued. A second part will give numerical data for fission reactions. The present document supersedes the previous report ECN-37. (Atomindex citation 11:502721)

ECN-71 MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Nuclear Data Guide for Reactor Neutron Metrology. Part 2. Fission Reactions (1979 Edition).
W. L. Zijp, and J. H. Baard. Aug 79, 70p
U.S. Sales Only. Microfiche copies only.

This document lists numerical data on fission reactions, the cross section data and the decay data of some fission product radionuclides, suitable for gamma ray counting. The selection of data is based on the usefulness to determine neutron flux densities, neutron fluences and neutron spectra. The data are mainly taken from existing review papers and evaluations. This report supplements a companion ECN-report with the same title, which report deals with activation reactions only and which has the subtitle Part 1: Activation reactions. This document was prepared for the Euratom Working Group on Reactor Dosimetry (EWGRD). The document may contribute to the creation of a common data set for all laboratories working in the field of reactor neutron metrology. It is expected that after one or two years an updated and revised guide will be issued. (Atomindex citation 11:502722)

IFVE-ONF-79-19 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Investigating the Factors Limiting the Counting Rate Characteristics of Drift Chambers.
N. I. Bozhko, A. A. Borisov, A. S. Vovenko, A. S. Kozhin, and R. M. Fachrutdinov. 1979, 23p
U.S. Sales Only.

The measurements were performed on the drift chamber with a multiwire sense element. The counting rate characteristics of the chamber with the 94%Ar+6%CO sub 2 mixture have been measured ad different geometries of the sense element and the amplifier sensitivity. The dependence of the plateau length of the counting rate characteristic on the CO sub 2 , CH sub 4 , C sub 2 H sub 2 , C sub 4 H sub 10 , CH sub 2 (OCH sub 3) sub 2 concentration has been obtained for binary mixtures with Ar within the interval (2-30)%. It is shown that the limitation of the plateau appears at high voltage due to postpulses, caused by photoeffect in the gas near the sense wire. For the gases CO sub 2 , CH sub 4 , C sub 4 H sub 10 which have large photoabsorption cross section in the energy interval corresponding to the Ar emission spectrum the maximum sizes of the plateau have been obtained. (Atomindex citation 11:503008)

ITEF-53(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
High-Energy Neutrino Detector Based on Pressurized Argon.
A. V. Vishnevkii, I. A. Golutvin, and B. A. Dolgoshein. 1979, 29p
In Russian.
U.S. Sales Only.

Proposed is an electron neutrino detector of a new type, where the track information is available for all charged particles. Argon pressurized up to the pressure of 100-150 atm. (p approximately O.2-0.3 g/cm exp 3) is used as a working substance. The particle track recording system in the volume of the detector is built on the principle of a multiwire wide-gap drift chamber (with the gap 1-1.5 m). It is possible to make a device with the operating substance mass of about 100 tons on the base of the detector. It gives the opportunity to solve the problems with (10 exp -5 -10 exp -3)xdeltasub(tot) cross sections at the intensity of neutrino beams achieved at modern accelerators. (Atomindex citation 11:503112)

JAERI-M-8085 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Track Segmentation Method for NTA Film.
S. Kumazawa. Feb 79, 24p
In Japanese.
U.S. Sales Only.

A method is presented for extracting thin segments of tracks from a gray-level digital picture of NTA film in automatic counting system. To extract thin segments of tracks despite drifting gray level of pixels (picture elements) in the background, the method performs a sequence of local operations involving every element and its 16 neighbors except those immediately outside, determining the class of the element concerning segment and nonsegment. The method is able to extract pixels in the track, scarcely those in the background, in a digitized picture (364 x 323 pixels with 7 bits/pixel) of the microphotograph. It extracts pixels of tracks embedded both in the dark and bright backgrounds. (Atomindex citation 11:503064)

JINR-1-12365 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Gamma and Electron Detector for a 90-Channel Cherenkov Mass Spectrometer.
P. G. Astvatsaturov, V. A. Kramarenko, A. I. Malakhov, G. L. Melkumov, and M. N. Khachaturyan. 1979, 12p
In Russian.
U.S. Sales Only.

The construction of the module of a 90-channel Cherenkov hodoscope of lead glass is described. The possibility of utilization of several types of glue for providing optical contact between the glass of the Cherenkov counter and photomultiplier is studied. The method used while selecting photomultipliers for the Cherenkov hodoscope is proposed. The use of 90 modules of the construction developed during eight years has shown their high reliability. (Atomindex citation 11:502998)

NIIAR-2(361) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Scattered Neutron Effects on the Shape of the Prompt Neutron Spectrum from exp 252 Cf Spontaneous Fission.
V. N. Nefedov, B. I. Starostov, and A. F. Semenov. 1979, 14p
In Russian.
U.S. Sales Only.

Presented are experimental results on the determination of the effect of electrons scattered on detector walls, and also in doors and in air, the effect being produced on the shape of neutron spectrum of exp 252 Cf fission in the energy range of O.01-1 MeV. It is found out that at flight distances of L>0.25 m, spectrum energy range of 0.01-0.4 MeV is weakly distored by the background of scattered neutrons at the corresponding design of a neutron detector. (Atomindex citation 11:503075)

NUREG/CR-1412 PC **A03**/MF **A01**
Argonne National Lab., IL.
Systems for Continuous Measurement of Airborne Radon-222 Concentration and Working Level,
Michael H. Momeni, Albin J. Zielen, James E. Miranda, Jr., Norbert D. Kretz, and Walter E. Kisieleski. Apr 80, 50p ANL/ES-88

A summary of available techniques for determining randon concentration and working level is presented. The continuous-monitoring methodology, instrumentation, calibration, theoretical basis for the technique, and simulation of diurnal variation of radon concentration and working level are described.

ORO-5933-T3 PC **A08**/MF **A01**
Oklahoma Univ., Norman. School of Electrical Engineering and Computing Sciences.
Timing of gamma Rays in Coaxial Germanium Detector Systems.
M. Y. El-Ibiary. 1979, 152p
Contract ER-78-S-05-5933

A study is reported on the timing uncertainty in gamma ray coaxial germanium detector systems. The work deals with the zero cross over method which is widely used to reduce the dependence of the instant of timing on the radiation energy absorbed and on the position within the detector at which absorption takes place. It is found that the amplitude risetime compensated (ARC) method gives, under normal conditions, the best resolution at a specific energy. For higher energies, the resolution improves and there is no shift of the mean instant of timing. The method is therefore well suited for wide energy coverage. The parameters involved in implementing an ARC system for optimum performance at a specific energy are identified in terms of the preamplifier noise level and risetime. A trade off can be made between the resolutions at high and at low energies. The time resolution attained is given by means of a series of charts which use normalized dimensionless variables for ready application to any given case. Lithium compensated Ge detectors which normally operate under conditions of velocity saturation of the charge carriers by applying sufficient bias voltage create an electric field in excess of 1 kV/cm throughout the depleted region. High purity Ge detectors where velocity saturation may not be reached within certain parts of the depleted region are studied. Special attention is given to the probability of pulses being incorrectly timed because of their slow rise or small magnitude. Such incorrect timing is energy-dependent and results in a noticeable distortion of the timing spectrum that relates to a wide energy range. Limitations on system parameters to keep the probability of incorrect timing below a specified fraction are given. (ERA citation 05:022854)

PATENT-4 173 660
Not available NTIS
Department of Energy, Washington, DC.
Method of Preparing a Thermoluminescent Phosphor.
Patent,
J. B. Lasky, and P. R. Moran. Filed 13 Jul 78, patented 6 Nov 79, 6p PAT-APPL-924 338
Supersedes PAT-APPL-924 338-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A thermoluminescent phosphor consisting of LiF doped with boron and magnesium is produced by diffusion of boron into a conventional LiF phosphor doped with magnesium. Where the boron dopant is made to penetrate only the outer layer of the phosphor, it can be used to detect shallowly penetrating radiation such as tritium beta rays in the presence of a background of more penetrating radiation. (ERA citation 05:026174)

PATENT-4 179 608
Not available NTIS
Department of Energy, Washington, DC.
Right/Left Assignment in Drift Chambers and Proportional Multiwire Chambers (PWC'S) Using Induced Signals.
Patent,
A. H. Walenta. Filed 10 May 78, patented 18 Dec 79, 6p PAT-APPL-904 678
Supersedes PAT-APPL-904 678-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved multiwire chamber is described which has means for resolving the left/right ambiguity in the location of an ionizing event. The chamber includes a plurality of spaced parallel anode wires positioned between spaced planar cathodes. Associated with each of the anode wires are a pair of localizing wires, one positioned on either side of the anode wire. The localizing wires are connected to a differential amplifier whose output polarity is determined by whether the ionizing event occurs to the right or left of the anode wire. (ERA citation 05:026266)

PB80-808694 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Bubble Chambers. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 172p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the design, construction, and use of several types of bubble chambers for the detection of particle radiation. Also included are articles on bubble chamber diagnostic equipment, film analysis techniques, and data reduction methods using computers. (Contains 192 citations)

PB80-808702 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Bubble Chambers. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 132p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the design, construction, and use of several types of bubble chambers for the detection of particle radiation. Also included are articles on bubble chamber diagnostic equipment, film analysis techniques, and data reduction methods using computers. (Contains 134 citations)

PB80-808710 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Bubble Chambers. 1970-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 42p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited articles describe the design, construction and use of several types of bubble chambers for the detection of particle radiation. Also included are articles on bubble chamber diagnostic equipment, film analysis techniques, and data reduction methods using computers. (Contains 36 citations)

PNCT-841-79-02 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Measurement of the Radioactive Aerosol Diameter by Position Sensitive Semiconductor Detectors, 1.
K. Nakata, and M. Kanamori. Jan 79, 63p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The measurement of the diameter of radioactive aerosol, in particular plutonium aerosol, is very important for the internal dose estimation. Determination of the diameter of radioactive aerosol is performed by using position sensitive semiconductor detector (PSD). The filter paper with the radioactive aerosols is contacted to the PSD which is connected to the data processor so that the diameter of the aerosol is calculated from the measured radioactivity. This investigation was performed in cooperation with Rikkyo University. (Atomindex citation 11:503074)

SAND-79-2196 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Neutron Activation System for Spectral Measurements of Pulsed Ion Diode Neutron Production.
D. L. Hanson, and L. W. Kruse. Feb 80, 41p
Contract EY-76-C-04-0789

A neutron energy spectrometer has been developed to study intense ion beam-target interactions in the harsh radiation environment of a relativistic electron beam source. The main component is a neutron threshold activation system employing two multiplexed high efficiency Ge(Li) detectors, an annihilation gamma coincidence system, and a pneumatic sample transport. Additional constraints on the neutron spectrum are provided by total neutron yield and time-of-flight measurements. A practical lower limit on the total neutron yield into 4 pi required for a spectral measurement with this system is approx. 10 exp 10 n where the neutron yield is predominantly below 4 MeV and approx. 10 exp 8 n when a significant fraction of the yield is above 4 MeV. Applications of this system to pulsed ion diode neutron production experiments on Hermes II are described. (ERA citation 05:023371)

SLAC-PUB-2457 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Moderated Neutron Sources for Calibrating Neutron Dosimeters for Reactor Environments.
H. Ing. Jan 80, 8p CONF-800607-3
Contract EY-76-C-03-0515
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Neutron dosimeters used around reactor environments are often calibrated with (alpha , n) sources or exp 252 Cf sources. Since these sources emit neutrons which are more energetic than those outside power reactors, the readings of dosimeters calibrated in this manner may be erroneous because of the variation in their energy response. To produce calibration sources whose neutrons approximate those to be monitored, certain groups have embedded sources in spheres of various materials. Recently, Environmental Measurements Laboratory (EML) has also decided to have such moderated sources for calibration. The assemblies chosen are spheres of polyethylene, 20.3 cm and 45.7 cm in diameter which can be enclosed by Fe shells 10.2 cm thick. The center of these assemblies has a cavity 1.2 cm in diameter containing a exp 252 Cf source 0.8 cm in diameter. This paper discusses the calculation of leakage spectra for these 4 assemblies. (ERA citation 05:022855)

TU-Inf-05-31-78 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Development of a Neutron Dosemeter for Personnel Dosimetry with Direct Response of Dose Equivalent in Neutron Fields of Different Energy Spectra. 1.
B. Doerschel. Dec 78, 14p
In German.
U.S. Sales Only.

An energy-independent neutron dosemeter is described. The dosemeter is based on a dielectric track detector (mica foil of 6 mu m thickness) between uranium and a thorium-232 radiator pulverized and pressed with polyvinyl alcohol enclosed within a cadmium shell. The track density is direct proportional to the dose equivalent between 5 x 10 exp -4 and 10 Sv. When evaluated every two months, the dosemeter has for 3 mSv an error of +- 50% decreasing at higher dose equivalents. (Atomindex citation 11:503021)

18E. Nuclear Power Plants

AECL-6335 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Future Developments in Nuclear Power.
G. J. Phillips. Dec 78, 14p
U.S. Sales Only.

To date, the peaceful application of nuclear energy has been largely restricted to the generation of electricity. Even with such an application there is potential for wider use of the nuclear energy generated in providing heat for dwellings, control of climate for the production of vegetables and providing warm water for fish and lobster farming. It is possible to envisage specific applications of nuclear power reactors to process industries requiring large blocks of energy. These and other future developments are reviewed in this report. (Atomindex citation 10:491952)

ANU-P-740 MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Nuclear Power and the Anti-Uranium Movement. A Modern Social Problem.
E. W. Titterton. Jan 79, 21p
U.S. Sales Only. Microfiche copies only.

The generation of electricity with nuclear power reactors is the cheapest, safest and cleanest means of power generation yet devised by man. It has been demonstrated to cause no more off-site nuclear radiation problems, and far less environmental damage, than the coal-fired electricity generating industry. With such a favourable situation it is reasonable to ask why, in the Western world, has a campaign been waged against uranium and the nuclear power industry. The author discusses what he believes is a well coordinated, international campaign which has been pursued through the media, and has been high-lighted by all the modern-day avenues open to protesters. (Atomindex citation 11:499869)

CEGB-RD/B/N-4574 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Modification Scheme for Seismic Acceleration - Time Histories.
J. Bethell. May 79, 12p
U.S. Sales Only.

A technique is described for the modification of recorded earthquake acceleration-time histories which gives reduced peak accelerations whilst leaving other significant characteristics unchanged. Such modifications are of use in constructing design basis acceleration-time histories such that all important parameters conform to a specified return period. The technique is applied to two recordings from the 1966 Parkfield earthquake, their peak accelerations being reduced in each case from about 40% g to 25% g. (Atomindex citation 11:502547)

GEFR-SP-185 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Accounting for Demand Failures in Markovian Analyses.
A. P. Wood. 3 Jan 80, 5p CONF-800607-19
Contract EY-76-C-03-0893-032
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Reliability has become a fundamental concern in the development of nuclear power plants. The use of Markov Analysis in reliability evaluations is progressing quickly since it offers methods for dealing with repair considerations, common cause failures, time-dependent failure rates, cyclic failures, and availability calculations. A Markov process is a stochastic or time-dependent process allowing time-dependent failure processes to be modelled easily. In redundant safety systems, however, there are often passive system components whose failure to start on demand is higher than their probability of failure during the time for which the safety system must function. It may be impossible to model this failure process as a system with standby failure rates because the actual failure may be caused by the demand itself. This paper deals with a method for extending Markov Analyses to include demand failures. (ERA citation 05:022411)

INIS-mf-5327 PC **A02**/MF **A01**
Atomic Industrial Forum, Inc., New York.
Lessons of Three Mile Island - Public Acceptance of Nuclear Power.
T. R. Jordan. 1979, 16p CONF-7909121-1
International conference on financing nuclear power, Copenhagen, Denmark, 23 Sep 1979.
U.S. Sales Only.

An evaluation is given of the effects which the accident at Three Mile Island has had on public acceptance of nuclear power in the United States. Furthermore the impact of the changes in public acceptance on the financing of nuclear power projects is assessed. (Atomindex citation 10:494414)

NUREG/CR-1489 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Best Estimate Method versus Evaluation Method: A Comparison of Two Techniques in Evaluating Seismic Analysis and Design.
Technical rept.,
S. E. Bumpus, J. J. Johnson, and P. D. Smith. Jul 80, 115p UCRL-52746
Report on Seismic Safety Margins Research Program.

The concept of how two techniques, Best Estimate Method and Evaluation Method, may be applied to the tradditional seismic analysis and design of a nuclear power plant is introduced. Only the four links of the seismic analysis and design methodology chain (SMC)--seismic input, soil-structure interaction, major structural response, and subsystem response--are considered. The objective is to evaluate the compounding of conservatisms in the seismic analysis and design of nuclear power plants, to provide guidance for judgments in the

SMC, and to concentrate the evaluation on that part of the seismic analysis and design which is familiar to the engineering community. An example applies the effects of three-dimensional excitations on the model of a nuclear power plant structure. The example demonstrates how conservatisms accrue by coupling two links in the SMC and comparing those results to the effects of one link alone. The utility of employing the Best Estimate Method vs the Evauation Method is also demonstrated.

ORAU/IEA-80-3(P) PC **A11**/MF **A01**
Oak Ridge Associated Universities, Inc., TN. Inst. for Energy Analysis.
Acceptable Future Nuclear Energy System. Gatlinburg II Condensed Workshop Proceedings, December 10-12, 1979, Gatlinburg, Tennessee.
M. W. Firebaugh, and M. J. Ohanian. Mar 80, 250p
Contract EY-76-C-05-0033

Information is presented concerning siting policies for nuclear power plants; safety aspects; utility commitments to nuclear power plants; and public opinion on nuclear power. (ERA citation 05:022380)

SAND-80-0837C PC **A02**/MF **A01**
Science Applications, Inc., Ames, IA.
Statistical Analysis of Reportable Events Due to Maintenance and Testing Activities in Nuclear Power Facilities.
S. M. Wong, K. Koehler, A. A. Husseiny, Z. A. Sabri, and J. L. Sprung. 1980, 21p CONF-800403-15
Contract EY-76-C-04-0789
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Operating experience of US commercial nuclear power plants has shown that routine maintenance, testing, and inspection activities play a significant role in their operational safety, reliability, and availability. Licensee Event Reports (LER's) for all nuclear power plants in commercial operation from 1972 to 1978 were reviewed for the base-line data. Out of 3600 reported events, 385 were traceable to maintenance and testing activities. Categories of actions which are most highly associated with particular component failures were identified through an analysis of cross-classified frequency tables. Inconsistencies in the pattern of association across the various systems and reactor types were investigated. (ERA citation 05:022387)

SRD-R-135 PC **A03**/MF **A01**
UKAEA Risley Nuclear Power Development Establishment, Culcheth (England). Safety and Reliability Directorate Culcheth.
Method for the Estimation of the Probability of Damage Due to Earthquakes.
M. A. H. G. Alderson. Jul 79, 40p
U.S. Sales Only.

The available information on seismicity within the United Kingdom has been combined with building damage data from the United States to produce a method of estimating the probability of damage to structures due to the occurrence of earthquakes. The analysis has been based on the use of site intensity as the major damage producing parameter. Data for structural, pipework and equipment items have been assumed and the overall probability of damage calculated as a function of the design level. Due account is taken of the uncertainties of the seismic data. (Atomindex citation 11:502543)

18F. Radiation Shielding and Protection

AERE-R-9500 PC **A09**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Nuclear Physics Div.
Energy Straggling of Heavy Ions in Solids.
N. E. B. Cowern. Aug 79, 184p
U.S. Sales Only.

The energy-loss straggling of heavy ions has been studied, principally in the Born Approximation region v > zv sub 0 . Measurements were made with 5.486 MeV alpha particles, 5 - 48 MeV exp 16 0 ions, and 3 - 36 MeV exp 12 C ions, incident on thin uniform Al foils. The thickness uniformity of the foils was studied with a proton microbeam and a surface profiler, and their homogeneity, purity and isotropy were investigated by electron microscope, proton backscattering, and X-ray diffraction studies. Using the Bethe theory of energy loss the charge-exchange model of energy straggling for heavy ions is confirmed. (Atomindex citation 11:498627)

CEA-CONF-4493 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Calculation of gamma-Rays and Fast Neutrons Fluxes with the Program Mercure-4.
A. Baur, C. Dupont, and B. Totth. 1978, 37p CONF-7811158-1
Ispra courses on radiation shielding methods, Varese, Italy, 20 Nov 1978.
U.S. Sales Only.

The program MERCURE-4 evaluates gamma ray or fast neutron attenuation, through laminated or bulky three-dimensionnal shields. The method used is that of line of sight point attenuation kernel, the scattered rays being taken into account by means of build-up factors for gamma and removal cross sections for fast neutrons. The integration of the point kernel over the range of sources distributed in space and energy, is performed by the Monte-Carlo method, with an automatic adjustment of the importance functions. Since it is operationnal the program MERCURE-4 has been intensively used for many various problems, for example: - the calculation of gamma heating in reactor cores, control rods and shielding screens, as well as in experimental devices and irradiation loops; - the evaluation of fast neutron fluxes and corresponding damage in structural materials of reactors (vessel steels...); - the estimation of gamma dose rates on nuclear instrumentation in the reactors, around the reactor circuits and around spent fuel shipping casks. (Atomindex citation 11:498625)

CEA-N-2079 PC **A04**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Resolution of the Unsteady Transport Equation by Finite Element Methods.
Y. Chauvet. 30 Jan 79, 56p
In French.
U.S. Sales Only.

A method for solving the one dimensional spherical geometry unsteady transport equation using discontinuous finite elements is proposed. The numerical scheme is very stable as shown by the differents tests performed. (Atomindex citation 11:497578)

CONF-791103-85 PC **A02**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Nuclear Engineering.
Proper Use of the Nordheim Integral Treatment for Resonance Processing.
R. E. Pevey, H. L. Dodds, Jr., N. M. Greene, and R. M. Westfall. 1979, 7p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The Nordheim integral treatment is an approximate method for determining the neutron spectra within materials containing resonance cross sections. These spectra are necessary to determine the flux-weighted multigroup data properly. In practice, the resonance material multigroup cross sections produced by use of Nordheim-generated spectra are combined with other multigroup cross sections, and further energy and spatial collapsing of the data is performed. The question arises of whether performing this spatial collapse following the Nordheim treatment constitutes double spatial weighting. To investigate this possibility, results were compared with those for a second method of forming the multigroup cross section data, and with the results of a fine-group calculation. It was concluded that the first method above is the procedure to follow for the proper use of the Nordheim integral treatment. 1 table. (ERA citation 05:023298)

HEDL-TC-1283 MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Data Package for the Turkey Point Material Interaction Test Capsules.
J. C. Krogness, and R. B. Davis. Jan 79, 94p
Contract EY-76-C-14-2170
Microfiche copies only.

Objective of the Materials Interaction Test (MIT) is to obtain interaction information on candidate package storage materials and geologies under prototypic temperatures in gamma and low level neutron fields. Compatibility, structural properties, and chemical transformations will be studied. The multiple test samples are contained within test capsules connected end-to-end to form a test train. Only passive instrumentation has been used to monitor temperatures and record neutron fluence. The test train contains seven capsules: three to test compatibility, two for structural tests, and two for chemical transformation studies. The materials tested are potential candidates for the spent fuel package canister and repository geologies. (ERA citation 05:022412)

JAERI-M-7977 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Quarterly Progress Report on the NSRR Experiments, (6). January to June 1978.
Dec 78, 150p
In Japanese.
U.S. Sales Only.

Studies of fuel behavior under simulated Reactivity Initiated Accident (RIA) conditions in NSRR have proceeded since October 1975. The results from January to June 1978 are described at the following tests; standard fuel tests (high energy deposition tests, pellet shape parameter tests, fuel supporter variation test), fuel design variable tests (pre-pressurized rod tests, reduced thickness cladding rod tests, narrow gapped rod tests, gap gas parameter tests), cooling environment variable tests (coolant temperature parameter tests, forced circulation tests) and defected fuel tests (water-logged fuel tests, fretting corroded fuel tests). (Atomindex citation 11:502929)

JAERI-M-8084 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Safety Test of Transport Packages for Radioisotopes.
S. Okane, and K. Tachikawa. Feb 79, 45p
In Japanese.
U.S. Sales Only.

The Division of Radioisotope Production, JAERI, has tested safety of type B(M), A and L packages according to the regulations of RI transportation. The type B(M) package weighing about 1800 kg. Used for transport of exp 192 Ir(6540 Ci) and exp 32 P(188 Ci) from reactors to the Radioisotope Production Laboratory, consists of a cylindrical plywood receptacle, aluminum honeycomb shock absorbers, steel framework and a 150 mm wall thickness drawer type lead container. Safety tests for type B(M) included 9 m high free drops in four postures, vertical, horizontal, corner and reverse, 1 m free drops on to an iron rod with in two postures, vertical and horizontal (the latter for punch test) and thermal test. The maximum acceleration in the punch test showed 735 G and in the 9 m drop test 2590 G. For thermal test of the whole package, a large muffle furnace was used. When the temperature of furnace reached 920 exp 0 C, the package was inserted into it and heated for 30 min. During the test surface temperature of the lead container rose only by 19.1 exp 0 C. In 12.2 m free drop of type A and L package as safety test, 5 ml vials containing simulation RI solution retained their integrity without breakage. (Atomindex citation 11:502782)

K/P-6567 PC **A02**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Cylinder Overpack Phenolic Foam Shock Testing.
W. D. Strunk. 28 Apr 80, 15p
Contract W-7405-ENG-26

The mechanical shock absorbability of phenolic foam made from reagent grade chemicals, specified in US Atomic Energy Commission (Department of Energy) Material and Equipment Specifi-

cation SP-9 is compared to that of foam made from substituted commercial grade chemicals. The testing reported herein compares mechanical properties of the foams. The test results demonstrate the equivalence in the shock absorbability of the two foam types. (ERA citation 05:024518)

SAND-79-1424 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Postmortem Metallurgical Examination of a Fire-Exposed Spent Fuel Shipping Cask.
H. J. Rack, and H. R. Yoshimura. Apr 80, 35p
Contract EY-76-C-04-0789

A potmortem examination of a large fire-exposed rail-transported spent fuel shipping container has revealed the presence of two macrofissures in the outer cask shell. The first, a part-thru crack located within the seam weld fusion zone of the outer cask shell, was typical of hot cracks that may be found in stainless steel weldments. The second, located within the stainless steel base metal, apparently originated at microcracks formed during the welding of a copper-stainless steel dissimilar metal joint. The latter microcrack then propagated during the fire-test, ultimately penetrating the outer shall of the cask. 18 figures, 2 tables. (ERA citation 05:024519)

SAND-80-0888C PC **A02**/MF **A01**
IRT Corp., San Diego, CA.
Best-Estimate LOCA Radiation Signature for Equipment Qualification.
N. A. Lurie, and L. L. Bonzon. 1980, 8p CONF-800403-37
Contract EY-76-C-04-0789
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

The radiation aspect of reactor equipment qualification depends on a knowledge of the appropriate source term. An attempt has been made to define a realistic radiation source corresponding to the loss-of-coolant accident. This best-estimate source is based on available fission product release data from damaged fuel during an unterminated LOCA as described in the Reactor Safety Study (WASH-1400). Energy release rates as a function of time have been calculated for both betas and gamma rays. The results are significantly different from the sources specified in Regulatory Guide 1.89. Spectra corresponding to the best-estimate source have also been computed at selected cooling times. (ERA citation 05:024097)

18G. Radioactive Wastes and Fission Products

AERE-R-9518 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemical Technology Div.
Predicted Peak Temperature-Rises around a High-Level Radioactive Waste Canister Emplaced in the Deep Ocean Bed.
K. L. Kipp. Jun 78, 20p
U.S. Sales Only.

A simple mathematical model of heat conduction was used to evaluate the peak temperature-rise along the wall of a canister of high-level radioactive waste buried in deep ocean sediment. Three different amounts of vitrified waste, corresponding to standard Harvest, large Harvest, and AVM canisters, and three different waste loadings were studied. Peak temperature-rise was computed for the nine cases as a function of canister geometry and storage time between reprocessing and burial. Lower waste loadings or longer storage times than initially envisaged are necessary to prevent the peak temperature-rise from exceeding 200 exp 0 C. The use of longer, thinner cylinders only modestly reduces the storage time for a given peak temperature. Effects of stacking of waste canisters and of close-packing were also studied. (Atomindex citation 11:503136)

B-HARC-411-021 PC **A02**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Public Participation in Nuclear Waste Management.
A. H. Schilling, and S. M. Nealey. Apr 79, 25p
Contract EW-78-C-06-1076

The recent report of the Interagency Review Group (IRG) on Nuclear Waste Management formalized what has become increasingly clear in recent years: public participation in nuclear waste management decisions is a fact of life and will be more emphasized in the future than in the past. The purpose of this paper is to discuss, and stimulate discussion, of major issues which must be considered before attempting to design and implement a program to encourage public participation in this complex and sensitive area. Public participation is a term with many possible meanings. The term is used here to stand for a very wide range of activities including: providing information about programs and intended actions, seeking advice or permission from state or local officials, conducting public meetings to announce plans and receive reactions, conducting hearings, establishing consultative panels of outside experts or special interest group members, and even conducting surveys of public opinion and concern. This paper is not a proposal or a set of specific recommendations, but a stimulus to thought and discussion. It was prepared with DOE's role in waste management in mind, and benefits from the authors' opportunity to observe the public participation process in this topic area to data. The paper is organized into four sections that take account of (1) past participation efforts, (2) why public participation is necessary and what might be gained by it, (3) considerations in designing a participation program, and (4) major principles involved in conducting a public participation program, including a brief review of participation procedures. (ERA citation 05:021877)

CEGB-RD/B/N-4447 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Experience Gained in the Accurate Measurement of Fission Product Distributions by Axial Fuel Pin gamma Scanning.
J. T. Dawson, and G. Smith. Jun 79, 30p
U.S. Sales Only.

The Central Electricity Generating Board carries out gamma scanning measurements in its rig situated in the post-irradiation facility at AEE Winfrith. The principal function of the rig, which has been operating successfully for six years, is to measure variations in fission product concentrations, from which information on corresponding relative ratings is inferred. The considerable care taken to ensure accurate measurement of fission product distributions is described. Reference is made to experimental tests and internal consistency checks to quantify the magnitudes of component uncertainties. The validity of the derived overall uncertainty is then assessed by comparing gamma scanning results with corresponding values obtained by independent techniques. It is concluded that accuracies of order +-1%(1 exp +) are being achieved in the routine measurement of selected fission product distributions. (Atomindex citation 11:502966)

CEGB-RD-B-N-4579 PC **A05**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Inventories of Actinide and Fission Product Arisings in Spent Nuclear Fuel: Results Using the RICE Code.
J. H. Mairs, and S. Nair. Jun 79, 92p
U.S. Sales Only.

The CEGB reactor inventory code RICE has been used to generate comprehensive inventories of actinide and fission products produced in reactor fuel during irradiation in Magnox, AGR and CFR systems. Revised neutron cross-section data for Magnox, AGR and CFR have been used. The decay characteristics of the spent fuels are studied for both short term and geological timescales from the point of view of spent fuel handling and waste management. The principal individual isotopes contributing to overall activity are identified and the neutron emission rates from spent fuel of high irradiation are investigated. The dependence of the actinide build-up on irradiation conditions are studied and compared for the Magnox and AGR systems, and the /sup 134,137/Cs arisings are analysed in detail for the Magnox system. The CFR investigations show the benefits of using fresh fuel of short storage time prior to CFR irradiation from the point of view of spent fuel handling and waste management. The actinide arisings during CFR irradiation are studied for feed fuels employing plutonium derived from Magnox, AGR and CFR equilibrium cycles, to show the advantage of using feed fuels containing Magnox plutonium. (Atomindex citation 11:501637)

CONF-791103-83(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Iodine Adsorption on Steel in Helium.
M. F. Osborne, and R. B. Briggs. 1979, 8p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The equilibrium loading of iodine on low chromium alloy steel as functions of iodine partial pressure, temperature, and metal surface conditions were measured. Desorption rates as functions of temperature and He purity were found and the hazards of iodine release as related to licensing and operation were studied. (ERA citation 05:022666)

CONF-791112-63 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Methods for Separating Actinides from Reprocessing and Refabrication Plant Wastes.
D. W. Tedder, B. C. Finney, and J. O. Blomeke. 1979, 8p
Contract W-7405-ENG-26
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Chemical processing flowsheets have been developed to partition actinides from all actinide-bearing LWR fuel reprocessing and refabrication plant wastes. These wastes include high-activity-level liquids, scrap recovery liquors, HEPA filters and incinerator ashes, and chemical salt wastes such as sodium carbonate scrub solutions, detergent cleanup streams, and alkaline off-gas scrubber liquors. The separations processes that were adopted for this study are based on solvent extraction, cation exchange chromatography, and leaching with Ce exp 4+ -HNO sub 3 solution. (ERA citation 05:023715)

CONF-791112-64 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Reaction of Hydrogen and Oxygen in the Presence of Concretes Incorporating Simulated Radioactive Waste.
S. Katz. 1979, 16p
Contract W-7405-ENG-26
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The radiolysis of contained water, with the potential of pressurization due to the accumulation of these radiolytically produced gases, has been identified as a major concern for radioactive wastes fixed in cementitious matrices. One estimate of the pressure build-up is that about 100 atmospheres pressure could accumulate in a standard canister containing alpha waste after 100,000 years. Since the radiolysis of concrete is dependent on the amount of unbound or free water present in the system, removal of all or most of this water would greatly reduce this rate. Regardless of the production rate however, pressurization from the accumulation of hydrogen and oxygen would be avoided if there were sufficient recombination of these gases as, or after, they were generated. These studies were undertaken to determine the recombination rates obtained with special cementitious matrices. The basis for this study was the realization that FUETAP concrete containing radioactive waste or perhaps some other added constituent could provide a surface to catalyze the recombination of any radiolytically produced hydrogen and oxygen. In this investigation, the rate of reaction between hydrogen and oxygen was measured by determining the yield of water or the depletion of oxygen, as mixture of these gases flowed through a bed of the test material. Three cementitious mixtures were examined, a neat cement paste and two FUETAP concretes. The data obtained with each of the three experimental systems show that there is a high hydrogen-oxygen recombination rate in presence of FUETAP concretes containing simulated waste. The data suggest that gas pressurization may not be a problem with FUETAP concretes containing waste, if one can ensure that adequate contact is main-

tained between the gases and the available solid surfaces. (ERA citation 05:021885)

CONF-791185-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Origin, Magnitude, and Treatment of Radioactive Wastes.
J. O. Blomeke. 1979, 27p
Contract W-7405-ENG-26
ANS student chapter seminar, College Station, TX, USA, 5 Nov 1979.

Radioactive wastes in solid, liquid, and gaseous forms are generated wherever radioactive materials are handled. Unlike conventional industrial wastes, most of them are not amenable (within presently available technology) to treatment that can destroy their toxicity. They become innocuous only through natural decay, and many of the isotopes of concern decay so slowly that they must be isolated from the environment for hundreds of thousands of years. The primary objective of nuclear waste management is to protect man and his environment from these materials by providing containment by means that are available within present or near-future technology. The origin and nature of the wastes are reviewed, and the methods of treatment that are in use or that soon can be made available are described. (ERA citation 05:021886)

CONF-791185-2 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Disposal of Radioactive Wastes.
J. O. Blomeke. 1979, 37p
Contract W-7405-ENG-26
ANS student chapter seminar, College Station, TX, USA, 5 Nov 1979.

Radioactive waste management and disposal requirements options available are discussed. The possibility of beneficial utilization of radioactive wastes is covered. Methods of interim storage of transuranium wastes are listed. Methods of shipment of low-level and high-level radioactive wastes are presented. Various methods of radioactive waste disposal are discussed. (ERA citation 05:021878)

CONF-800403-17 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
National Academy of Sciences Survey on Risks Associated with Nuclear Power.
J. R. Buchanan. 1980, 9p
Contract W-7405-ENG-26
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

A critical review of the literature pertaining to the risks associated with nuclear electric power was sponsored by the Committee on Science and Public Policy of the National Academy of Sciences. Although the full report (consisting of over 25 chapters) has not yet been published, this paper presents highlights from the Summary and Synthesis Chapter, which was released separately. Of the risks whose magnitudes can be estimated with reasonable accuracy, the most serious is the exposure of future generations to exp 14 C from reactors and reprocessing plants. Prospects are good for reducing this risk considerably, since carbon can be collected and stored as waste. (ERA citation 05:022426)

CONF-800416-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Progress Report on the Design of a Low-Level Waste Pilot Facility at ORNL.
L. C. Hensley, V. L. Turner, and A. S. Pruitt. 1980, 7p
Contract W-7405-ENG-26
UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22 Apr 1980.

All low-level radioactive solid wastes, excluding TRU wastes, are disposed of by shallow land burial at the Oak Ridge National Laboratory. Contaminated liquids and sludges are hydrofractures. The TRU wastes are stored in a retrievable fashion in concrete storage facilities. Currently, the capacity for low-level radioactive waste burial at the Oak Ridge National Laboratory is adequate for another six years of service at the current solids disposal rate which ranges between 80,000 and 100,000 cu ft per year. Decontamination and decommissioning of a number of ORNL facilities will be a significant activity in the next few years. Quantities of radioactive materials to be stored or disposed of as a result of these activities will be large; therefore, the technology to dispose of large quantities of low-level radioactive wastes must be demonstrated. The UCC-ND Engineering Division, in concert with divisions of the Oak Ridge National Laboratory, has been requested to prepare a conceptual design for a facility to both dispose of the currently produced low-level radioactive waste and aiso to provide a test bed for demonstration of other processes which may be used in future low-level radioactive wastes disposal facilities. This facility is designated as the Low-Level Waste Pilot Facility (LLWPF). This paper describes the status of the conceptual design of a facility for disposal of the subject radioactive waste. (ERA citation 05:021879)

CONF-800416-4 MF **A01**
Oak Ridge National Lab., TN.
ORNL Decontamination and Decommissioning Program.
J. P. Bell. 1980, 29p
Contract W-7405-ENG-26
UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22 Apr 1980.
Microfiche copies only.

A program has been initiated at ORNL to decontaminate and decommission surplus or abandoned nuclear facilities. Program planning and technical studies have been performed by UCC-ND Engineering. A feasibility study for decommissioning the Metal Recovery Facility, a fuel reprocessing pilot plant, has been completed. (ERA citation 05:021887)

DOE/EIS-0015 PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement: US Spent Fuel Policy.
May 80, 1238p-in 5v

The analysis of the environmental impacts for storage of domestic fuel shows that the impacts for the full range of alternatives considered are relatively small compared with available resources or background exposure of the population from natural radiation sources. The differences in impacts of storage of domestic fuel are attributed to the amount of fuel stored in Independent Spent Fuel Storage (ISFS) facilities, the storage time, and, to a lesser degree, the differences in spent fuel transportation. The differences between comparable alternatives of implementing the policy or not implementing the policy are small. The difference in impacts of storage of foreign fuel are attributed to the amount of fuel received under the policy and to the disposition mode analyzed. The impact of storage of foreign fuel (a small fraction of the amount of domestic fuel considered) is also small. As a result of the small differences in environmental impacts of all cases considered for foreign fuel, environmental impacts probably will not strongly influence the selection of the case that best meets US nonproliferation goals. Proliferation benefits of the various cases analyzed vary significantly. The structure and level of fee charged for storage of spent fuel will affect the degree of participation in the spent fuel storage program by utilities. However, the range of participation is within the range of alternatives analyzed in the draft EISs on storage of US and foreign fuels, for which the environmental effects were found to be relatively small. The fee computed on the basis of full recovery of government costs should not significantly affect the cost of generating nuclear power. (ERA citation 05:023723)

DOE/SR-WM-80-1 PC **A15**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Savannah River Waste Management Program Plan.
Apr 80, 338p
Contract EY-76-C-09-0001

This document provides the program plan as requested by the Savannah River Operations Office of the Department of Energy. The plan was developed to provide a working knowledge of the nature and extent of the waste management programs being undertaken by Savannah River contractors for the Fiscal Year 1980. In addition, the document projects activities for several years beyond 1980 to adequately plan for safe handling and storage of radioactive wastes generated at Savannah River, for developing technology to immobilize high-level radioactive wastes generated and stored at SR, and for developing technology for improved management of low-level solid wastes. (ERA citation 05:021880)

DP-MS-80-39 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
High Level Nuclear Waste.
J. L. Crandall. 1980, 40p CONF-800535-1
Contract AC09-DPSR00001
ASME Idaho section symposium, Idaho Falls, ID, USA, 29 May 1980.

The DOE Division of Waste Products through a lead office at Savannah River is developing a program to immobilize all US high-level nuclear waste for terminal disposal. DOE high-level wastes include those at the Hanford Plant, the Idaho Chemical Processing Plant, and the Savannah River Plant. Commercial high-level wastes, for which DOE is also developing immobilization technology, include those at the Nuclear Fuel Services Plant and any future commercial fuels reprocessing plants. The first immobilization plant is to be the Defense Waste Processing Facility at Savannah River, scheduled for 1983 project submission to Congress and 1989 operation. Waste forms are still being selected for this plant. Borosilicate glass is currently the reference form, but alternate candidates include concretes, calcines, other glasses, ceramics, and matrix forms. (ERA citation 05:023717)

ENICO-1016 PC **A06**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
WCF Feed Chemistry Studies.
B. J. Newby. Apr 80, 103p
Contract AC07-79ID01675

Two methods using calcium nitrate are reported which effectively suppress fluoride and chloride volatility during calcination of first-cycle zirconium waste with minimum production of solids in calciner feed. Fluoride and chloride volatility suppression was accomplished by either increasing the aluminum concentration of the zirconium waste or blending the zirconium waste with sodium-bearing waste prior to calcium nitrate addition. Both methods were successfully tested in 10-cm diameter, fluidized-bed, pilot-plant calciner runs. (ERA citation 05:021890)

JAERI-M-8045 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Data Sheets of Fission Product Release Experiments for Light Water Reactor Fuel, (1).
K. Yamamoto, C. Nakazaki, H. Itami, N. Ishiwatari, and Y. Togo. Jan 79, 128p
In Japanese.
U.S. Sales Only. Microfiche copies only.

A series of fission product (FP) release experiments is proceeding with Oarai Water Loop 1 (OWL-1) installed to the JMTR. The purpose is to clarify behavior and mechanism of FP release from a defective fuel rod in normal operation light water reactor (LWR) plants, and to estimate the iodine spiking amount from a defective fuel rod in accidents such as the main steam pipe breakage of a BWR plant and the steam generator tube breakage of a PWR plant. The present report describes an outline of the FP release experiments and facility and results of the preliminary outpile, preparatory, first and second FP release experiments. (Atomindex citation 11:502943)

JAERI-M-8184 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Measurement Data of Cesium 137 Yields in Primary Coolant of an In-Pile Water Loop in Fission Products Release Experiment.
N. Ishiwatari, H. Nagai, and T. Takeda. Mar 79, 39p
In Japanese.
U.S. Sales Only.

Series of fuel rods (UO sub 2 pellets sheathed with stainless steel) having an artificial pinhole were ir-

radiated in the in-pile test section of water loop JMTR OWL-1. Presented are the results of measurements of cesium 137 yields in primary coolant of OWL-1 from 1975 to 1978. (Atomindex citation 11:502928)

LA-UR-80-692 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
USDOE Radioactive Waste Incineration Technology: Status Review.
L. C. Borduin, and A. L. Taboas. 1980, 25p
CONF-800334-5
Contract W-7405-ENG-36
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

Early attempts were made to incinerate radioactive wastes met with operation and equipment problems such as feed preparation, corrosion, inadequate off-gas cleanup, incomplete combustion, and isotope containment. The US Department of Energy (DOE) continues to sponsor research, development, and the eventual demonstration of radioactive waste incineration. In addition, several industries are developing proprietary incineration system designs to meet other specific radwaste processing requirements. Although development efforts continue, significant results are available for the nuclear community and the general public to draw on in planning. This paper presents an introduction to incineration concerns, and an overview of the prominent radwaste incineration processes being developed within DOE. Brief process descriptions, status and goals of individual incineration systems, and planned or potential applications are also included. (ERA citation 05:021891)

LA-8200-ENV PC **A07**/MF **A01**
Los Alamos Scientific Lab., NM.
Environmental Surveillance at Los Alamos During 1979.
Apr 80, 149p
Contract W-7405-ENG-36

This report documents the environmental surveillance program conducted by the Los Alamos Scientific Laboratory (LASL) in 1979. Routine monitoring for radiation and radioactive or chemical substances was conducted on the Laboratory site and in the surrounding region to determine compliance with appropriate standards and permit early identification of possible undesirable trends. Results and interpretation of the data for 1979 on penetrating radiation, chemical and radiochemical quality of ambient air, surface and ground water, municipal water supply, soils and sediments, food, and airborne and liquid effluents are included. Comparisons with appropriate standards and regulations or with background levels from natural or other non-LASL sources provide a basis for concluding that environmental effects attributable to LASL operations are minor and cannot be considered likely to result in any hazard to the population of the area. Results of several special studies provide documentation of some unique environmental conditions in the LASL environs. (ERA citation 05:022959)

LBL-8423 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Determination of In-Situ Thermal Properties of Stripa Granite from Temperature Measurements in the Full-Scale Heater Experiments: Method and Preliminary Results. Technical Information Report No. 24.
J. A. Jeffry, T. Chan, N. G. W. Cook, and P. A. Witherspoon. May 79, 34p SAC-24, CONF-781246-2
Contract W-7405-ENG-48
American Geophysical Union annual fall meeting, San Francisco, CA, USA, 4 Dec 1978.

The in-situ thermal conductivity and thermal diffusivity of a granite rock mass at the Stripa mine, Sweden, have been extracted from the first 70 days of temperature data for the 5 kW full-scale heater experiment by means of least-squares fit to a finite-line source solution. Thermal conductivity and thermal diffusivity have been determined to be 3.69 W/(m- exp 0 C) and 1.84 x 10 exp -6 m exp 2 /s, respectively, at an average rock temperature of 23 exp 0 C (the average value of the actual temperature data used). These values are only slightly higher than the corresponding laboratory values, i.e., there is no significant size effect in the thermal properties of this rock mass. Since the size and shape of the heater canister used are similar to those considered for nuclear waste canisters and a substantial volume of rock is heated, the thermal properties obtained in this study are representative of in-situ rock mass properties under actual nuclear repository operating conditions. (ERA citation 05:021896)

LBL-9945 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Waste Isolation Safety Assessment Program. Task 4. Collection and Generation of Transport Data Theoretical and Experimental Evaluation of Waste Transport in Selected Rocks. Annual Progress Report, October 1, 1978-September 30, 1979.
R. J. Silva, L. V. Benson, A. W. Yee, and G. A. Parks. 30 Sep 79, 108p
Contract W-7405-ENG-48

The objective of the program is to establish a basis for the prediction of radionuclide sorption in geologic environments. In FY 79, experimental and theoretical efforts were concentrated on a study of the sorption of cesium on the solid substrates Minu-sil (quartz) and Belle Fourche clay (montmorillonite). Cesium sorption isotherms were obtained for the two substrates at 26 exp 0 C as a function of initial Cs concentration in solution (10 exp -3 M to 10 exp -9 M), pH (5 to 10) and supporting electrolyte concentration (0.002M, 0.01M, 0.1M, and 1M) NaCl and a simulated basalt groundwater in batch-type experiments using crushed material. Characterization of the solid phases included measurements of chemical compositions, particle sizes, surface areas, and cation-exchange capacities. In addition, potentiometric acid/base titrations of the solid phases were conducted in order to determine the acid dissociation and electrolyte exchange constants of the surfaces. Preliminary analysis of the sorption data indicate that while the clay data could be explained by simple mass-action expressions, the quartz data could not. Theoretical efforts were aimed at developing and testing an electrolyte binding electrical double-layer model to predict sorption isotherms. A computerized version of the model, MINEQL, which simultaneously considers surface and solution chemical equilibria, was brought to operational status. Input parameters required by MINEQL were determined and sorption isotherms for Cs on the Belle Fourche clay were calculated over the same range of parameters as the experimental measurements. Comparisons showed that the model was able to simulate the isotherms quite well except at the lowest pH values for the 0.002M and 0.01M NaCl solutions. (ERA citation 05:021898)

NUREG/CR-0570-V-1 PC **A19**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technology, Safety and Costs of Decommissioning a Reference Low-Level Waste Burial Ground. Volume 1. Main Report.
Technical rept.,
E. S. Murphy, and G. M. Holter. Jun 80, 445p
See also Volume 2, NUREG/CR-0570-V-2.

Technology, safety and cost information is presented for the conceptual decommissioning of a reference low-level waste burial grounds, both on a dry and wet site. Two basic approaches to decommissioning, stabilization followed by at least 200 years of surveillance and disinterment, were studied to obtain comparisons between costs and occupational radiation doses, potential dose to the public and other safety impacts.

NUREG/CR-0570-V-2 PC **A12**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technology, Safety and Costs of Decommissioning a Reference Low-Level Waste Burial Ground. Volume 2. Appendices.
Technical rept.,
E. S. Murphy, and G. M. Holter. Jun 80, 267p
See also Volume 1, NUREG/CR-0570-V-1.

Contents:
- Reference site details;
- Waste inventory details;
- Radiation dose methodology;
- Environmental surveillance and records maintenance details;
- Payments needed to finance decommissioning;
- Site/waste stabilization decommissioning activity details;
- Waste relocation decommissioning activity details;
- Cost assessment details;
- Radiological safety details.

NUREG/CR-0672-V-1 PC **A14**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station. Volume 1. Main Report.
Technical rept. Sep 77-Oct 79,
H. D. Oak, G. M. Holter, W. E. Kennedy, Jr., and G. J. Konzek. Jun 80, 309p
See also Volume 2, NUREG/CR-0672-V-2.

Technology, safety and cost information is given for the conceptual decommissioning of a large (1100MWe) boiling water reactor (BWR) power station. Three approaches to decommissioning, immediate dismantlement, safe storage with deferred dismantlement and entombment, were studied to obtain comparisons between costs, occupational radiation doses, potential dose to the public and other safety impacts. It also shows the sensitivity of decommissioning safety and costs to the power rating of a BWR in the range of 200 to 1100 MWE.

NUREG/CR-0672-V-2 PC **A99**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station. Volume 2. Appendices.
Technical rept. Sep 77-Oct 79,
H. D. Oak, G. M. Holter, W. E. Kennedy, Jr., and G. J. Konzek. Jun 80, 702p
See also Volume 1, NUREG/CR-0672-V-1.

Technology, safety and cost information is given for the conceptual decommissioning of a large (1100MWe) boiling water reactor (BWR) power station. Three approaches to decommissioning, immediate dismantlement, safe storage with deferred dismantlement and entombment, were studied to obtain comparisons between costs, occupational radiation doses, potential dose to the public and other safety impacts. It also shows the sensitivity of decommissioning safety and costs to the power rating of a BWR in the range of 200 to 1100 MWE. This volume contains the appendices.

NUREG/CR-1407 PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
A Field and Modeling Study of Windblown Particles from a Uranium Mill Tailings Pile.
L. C. Schwendiman, G. A. Sehmel, T. W. Horst, C. W. Thomas, and R. W. Perkins. Jun 80, 240p
PNL-3345
See also report dated Apr 79, NUREG/CR-0629.

An extensive field study whose primary objective was to obtain knowledge and understanding of the nature and quantity of windblown particles from uranium mill tailings piles was conducted in the Ambrosia Lake District of New Mexico. The following major field tasks were undertaken: determination of physical, chemical, and radioactivity characteristics of mill tailings particles; an investigation of the nature and quantity of tailings particles in soil in the vicinity of tailings piles; and the determination of the nature and flux of particles being transported by wind as a function of wind speed and height. Results of the field study are presented. Particle size distributions and associated radioactivity were measured.

ONWI-85 PC **A04**/MF **A01**
California Univ., Berkeley.
Thermal Gradient Brine Inclusion Migration in Salt Study: Gas-Liquid Inclusions, Preliminary Model.
D. R. Olander, and A. J. Machiels. Oct 79, 53p
Contract EY-76-C-06-1830

Natural salt deposits contain small cubical inclusions of brine distributed through the salt. Temperature gradients, resulting from storing heat-generating wastes in the salt, can cause the inclusions to move through the salt. Prediction of the rate and amount of brine-inclusion migration is necessary for the evaluation of bedded or domed salts as possible media for waste repositories. In-

clusions filled exclusively with liquid migrate up the temperature gradient towards the heat source. The solubility of salt in the brine inclusion increases with temperature. Consequently, salt dissolves into the inclusion across the hot surface and crystallizes out at the cold surface. Diffusion of salt within the liquid phase from the hot to the cold faces causes the inclusions to move in the opposite direction. In so doing, they change shape and eventually become rectangular parallelipipeds with a width (dimension perpendicular to the thermal gradient) much larger than the thickness (dimension in the direction of the thermal gradient). The inclusions may also contain a gas phase predominantly consisting of water vapor. These entities are termed two-phase or gas-liquid inclusions. The two-phase inclusions usually migrate down the temperature gradient away from the heat source remaining more-or-less cubical. A two-phase inclusion also forms when an all-liquid inclusion reaches the waste package; upon opening up at the salt-package interface, the brine partially evaporates and the inclusion reseals with some insoluble gas trapped inside. These gas-liquid inclusions proceed to move down the temperature gradient, in the opposite sense of the all-liquid inclusions. The gas-liquid inclusions phenomenon provides a pathway by which radionuclides leached from the wasteform by the brine can be transported away from the waste package and thus might have greater access to the biosphere. (ERA citation 05:023732)

ORNL/ENG/INF-80/1 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Management of Solid Waste.
W. T. Thompson, and L. H. Stinton. 16 Apr 80, 21p CONF-800416-2
Contract W-7405-ENG-26
UCC-ND and GAT waste management seminar program, Portsmouth, OH, USA, 22 Apr 1980.

Compliance with the latest regulatory requirements addressing disposal of radioactive, hazardous, and sanitary solid waste requires the application of numerous qualitative and quantitative criteria in the selection, design, and operation of solid waste management facilities. Due to the state of flux of these regulatory requirements from EPA and NRC, several waste management options were identified as being applicable to the management of the various types of solid waste. This paper highlights the current regulatory constraints and the design and operational requirements for construction of both storage and disposal facilities for use in management of DOE-ORO solid waste. Capital and operational costs are included for both disposal and storage options. (ERA citation 05:021899)

ORNL/SUB-79/13837/2 PC **A12**/MF **A01**
Gilbert/Commonwealth, Reading, PA.
State of the ART Review of Radioactive Waste Volume Reduction Techniques for Commercial Nuclear Power Plants.
Apr 80, 251p
Contract W-7405-ENG-26

A review is made of the state of the art of volume reduction techniques for low level liquid and solid radioactive wastes produced as a result of: (1) operation of commercial nuclear power plants, (2) storage of spent fuel in away-from-reactor facilities, and (3) decontamination/decommissioning of commercial nuclear power plants. The types of wastes and their chemical, physical, and radiological characteristics are identified. Methods used by industry for processing radioactive wastes are reviewed and compared to the new techniques for processing and reducing the volume of radioactive wastes. A detailed system description and report on operating experiences follow for each of the new volume reduction techniques. In addition, descriptions of volume reduction methods presently under development are provided. The Appendix records data collected during site surveys of vendor facilities and operating power plants. A Bibliography is provided for each of the various volume reduction techniques discussed in the report. (ERA citation 05:021900)

ORNL/SUB-80/13619/1 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Identification of Technical Problems Encountered in the Shallow Land Burial of Low-Level Radioactive Wastes.
D. G. Jacobs, J. S. Epler, and R. R. Rose. Mar 80, 187p
Contract W-7405-ENG-26

A review of problems encountered in the shallow land burial of low-level radioactive wastes has been made in support of the technical aspects of the National Low-Level Waste (LLW) Management Research and Development Program being administered by the Low-Level Waste Management Program Office, Oak Ridge National Laboratory. The operating histories of burial sites at six major DOE and five commercial facilities in the US have been examined and several major problems identified. The problems experienced st the sites have been grouped into general categories dealing with site development, waste characterization, operation, and performance evaluation. Based on this grouping of the problem, a number of major technical issues have been identified which should be incorporated into program plans for further research and development. For each technical issue a discussion is presented relating the issue to a particular problem, identifying some recent or current related research, and suggesting further work necessary for resolving the issue. Major technical issues which have been identified include the need for improved water management, further understanding of the effect of chemical and physical parameters on radionuclide migration, more comprehensive waste records, improved programs for performance monitoring and evaluation, development of better predictive capabilities, evaluation of space utilization, and improved management control. (ERA citation 05:023733)

ORNL/TM-7371 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
High-Level Waste Program Progress Report, January 1, 1980-March 31, 1980.
May 80, 31p
Contract W-7405-ENG-26

FUETAP concretes cured at 100 exp 0 C and 0.1 or 0.6 MPa had essentially the same physical properties as those cured at higher temperatures and pressures. Standard specimens containing high concentrations of exp 244 Cm showed little gasification after 1 month. The large (23-cm ID) spray calciner has been completed and is operating satisfactorily. Construction was completed on a sphere-forming system capable of producing 100-g batches of Synroc spheres by internal gelation, and several runs were made. Preparations for the compatibilty tests are underway. (ERA citation 05:023722)

PAT-APPL-6-068 359 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method for Storing Spent Nuclear Fuel in Repositories.
Patent Application,
D. G. Schweitzer, C. Sastre, and W. Winsche.
Filed 21 Aug 79, 8p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for storing radioactive spent fuel in repositories containing sulfur as the storage medium is disclosed. Sulfur is non-corrosive and not subject to radiation damage. Thus, storage periods of up to 100 years are possible. (ERA citation 05:025355)

PAT-APPL-6-070 548 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method for Storing Nuclear Fuel in Resopositories.
Patent Application,
D. G. Schweitzer, and C. Sastre. Filed 28 Aug 79, 5p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for storing radioactive spent fuel in repositories containing polyphenyl or silicon oil as the storage medium is disclosed. Polyphenyls and silicon oils are non-corrosive and are not subject to radiation damage. Thus, storage periods of up to 100 years are possible. (ERA citation 05:025354)

PNL-2862 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Effectiveness of Geologic Isolation Systems: The Feasibility of Computer Interrogation of Experts for WISAP.
L. H. Wight. May 80, 101p
Contract EY-76-C-06-1830

Simulation of the response of a waste repository to events that could initiate a fault tree to breach and failure is currently a keystone to the Battelle Waste Isolation Safety Assessment Program (WISAP). The repository simulation, which is part of the Disruptive Event Analysis Task, models the repository for its entire design life, one million years. This is clearly a challenging calculation, requiring input unlike any other response analysis by virtue of the long design life of the facility. What technology will provide design criteria for a million year design life. Answers to questions like this can, to some extent, be based on data, but always require some subjective judgments. The subjectivity, which is sometimes driven by inadequate or incomplete data or by a lack of understanding of the physical process, is therefore a crucial ingredient in an analysis of initiating events. Because of the variety of possible initiating events (glaciation, man-caused disruption, volcanism, etc.), many expert opinions will be solicited as input. The complexity of the simulation, the variety of experts involved, and the volume of applicable data all suggest that there may be a more direct, economical method to solicit the expert opinion. This report addresses the feasibility of such a system. Background information is presented that demonstrates the advantages of a computer interrogation system over conventional interrogation and assessment techniques. In the subsequent three sections the three elements - structure and decomposition, scaling, and synthesis - that are basic to any interrogation and assessment technique are reviewed. The interrelationship are schematically illustrated between these three fundamental elements and, therefore, serves as a useful guide to these three sections. Each of these three sections begins with a recommended approach to the particular element and ends with an illustration of representative dialogue. (ERA citation 05:023736)

PNL-2874 PC **A15**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Waste Isolation Safety Assessment Program. Technical Progress Report for FY-1978.
A. Brandstetter, M. A. Harwell, B. W. Howes, G. L. Benson, and D. J. Bradley. Jul 79, 338p
Contract EY-76-C-06-1830

Associated with commercial nuclear power production in the United States is the generation of potentially hazardous radioactive wastes. The Department of Energy (DOE) is seeking to develop nuclear waste isolation systems in geologic formations that will preclude contact with the biosphere of waste radionuclides in concentrations which are sufficient to cause deleterious impact on humans or their environments. Comprehensive analyses of specific isolation systems are needed to assess the expectations of meeting that objective. The Waste Isolation Safety Assessment Program (WISAP) has been established at the Pacific Northwest Laboratory (operated by Battelle Memorial Institute) for developing the capability of making those analyses. Progress on the following tasks is reported: release scenario analysis, waste form release rate analysis, release consequence analysis, sorption-desorption analysis, and societal acceptance analysis. (ERA citation 05:023737)

PNL-3317-1 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Commercial Nuclear Reactors and Waste: The Current Status.
A. M. Platt, and J. V. Robinson. Apr 80, 55p
Contract EY-76-C-06-1830

During the last five years, the declared size of the commercial light water reactor (LWR) nuclear power industry in the US has steadily decreased. As of January 1980, the total number of power plants had dropped to 191 from the 226 in December 31, 1974. At least another nine were cancelled

in the last few months. This report was developed as the first of a series to track implications to waste management due to such changes in the declared size of the industry. For the presently declared size, key conclusions are: the declared reactors will peak at a capacity of 162 GWe and consume about 10 exp 6 MTU as enrichment feed. As few as two repositories of about 100,000 MTHM capacity each would hold the waste. Predisposal storage (reactor basins and AFRs) would peak at less than 100,000 MTHM (in the year 2020) with one repository opening in the year 1997 and the other in the year 2020. Most of the 100,000 MTHM would have to be in AFR storage unless current practice regarding reactor basin size was radically changed. (ERA citation 05:021883)

SAND-79-1245 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Gas Generation from Transuranic Waste Degradation: Data Summary and Interpretation.
M. A. Molecke. Dec 79, 71p
Contract EY-76-C-04-0789

A comprehensive review of all applicable gas generation data resulting from the degradation of existing and potential forms of transuranic-contaminated wastes is presented. Extensive experimental studies have been performed under both realistic environmental conditions expected in the Waste Isolation Pilot Plant and overtest conditions. Degradation mechanisms investigated were radiolysis, thermal decomposition and dewatering, bacterial action, and chemical corrosion. Waste matrices studied include cellulosics, plastics, rubbers, organic composite, concrete-TRU ash, asphalt, process sludges, and mild steel. Measured gas generation rates are presented in terms of gas moles/year/drum of waste and in G(gas) values for radiolysis. The effects of multiple variables on gas generation are also described. 7 figures, 15 tables. (ERA citation 05:013148)

SAND-80-0023C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Technology Information Center.
E. L. Emerson, E. W. Shepherd, and E. E. Minor. 1980, 7p CONF-800354-1
Contract EY-76-C-04-0789
USDOE environmental control symposium, Washington, DC, USA, 17 Mar 1980.

A Transportation Technology Center (TTC) has been established at Sandia to address the transportation of nuclear waste and spent fuel. The Technology Information Center (TIC) acts as TTC's clearing house for nuclear material transportation information. TIC's activities are divided into three activities: public information, policy information, and technical information. Some of the uses of TIC's activities are briefly outlined. (ERA citation 05:021884)

SAND-80-0359C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Strategy for Evaluating the Long-Term Stability of Hole-Plugging Materials in Their Geological Environments.
S. J. Lambert. 1980, 11p CONF-800527-2
Contract EY-76-C-04-0789
International BHP symposium, Columbus, OH, USA, 7 May 1980.

Material used to plug boreholes will not in general be in chemical equilibrium with its host rock. Adverse long-term performance of a plug can involve changes in phase assemblage in the plug/rock system which are difficult to observe at low temperatures in real time. The thermodynamics of multiphase equilibria provides a technique of predicting what phase changes might occur. The thermodynamic treatment of plug/rock systems utilizes (1) a formulation of possible chemical reactions among phases in the system and (2) determinations of changes in values of Gibbs' free energies for the hypothetical reactions, to identify the theoretically-permitted reactions which could degrade plug performance. Time-dependent prediction of phase changes requires a knowledge of rate laws and constants for specific reactions whose mechanisms are well known. (ERA citation 05:023743)

SAND-80-0416 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Stored Energy of gamma-Irradiated WIPP Salt.
M. Moss. Mar 80, 21p
Contract EY-76-C-04-0789

Samples of WIPP salt exposed at 363 exp 0 K to gamma radiation from a exp 60 Co source were annealed at constant rates of heating in a differential scanning calorimeter in order to release the energy stored. Radiation doses were 2.2, 5.4, 8.2, 11 and 13 x 10 exp 9 rad, and temperature scans were conducted from room temperature to 800 exp 0 K. The specific stored energy-dose relationship deduced from 80 K/min scans could be only approximately established due to the extreme variability of the specific energy in samples of a given dose. This variability probably results from unequal amounts of impurities in the 10 to 25 mg samples required for the calorimeter. The energy-dose relationship is best described empirically by lnQ sub 0 (cal/g) = (-40.6 +- 2.6) + (1.84 +- 0.12) lnD(rad). Temperature scans of 10, 20, 40, and 80 K/min were performed to determine the activation energy E of the annealing process. For the four more highly dosed samples, E = 31.1 +- 5.6 kcal/mole. Based upon criteria established elsewhere, there appears to be no danger of the stored energy being released quickly in a nuclear waste repository of bedded salt, nor could serious consequences result from such a release by some unforeseen mechanism. (ERA citation 05:021903)

SAND-80-0502C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Role of Borehole Plugging in the Evaluation of the Waste Isolation Pilot Plant.
T. O. Hunter. 1980, 20p CONF-800527-3
Contract EY-76-C-04-0789
International BHP symposium, Columbus, OH, USA, 7 May 1980.

Research on borehole plugging (BHP) is part of an integrated strategy to develop technology that can assure successful nuclear waste isolation. The application of this strategy to the Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico has included an assessment of the role BHP plays in the development of a repository at that site. This paper presents a description of the WIPP site, repository design, and the current research and development program. The status of drill holes - those drilled for petroleum and potash exploration and those drilled for site characterization - within the proposed site boundaries is presented. Sixty-six holes are present on the 7700 hectare (19,000 acre) site, yet only 8 penetrate as deep as the proposed repository location. The assumptions made about shaft and borehole sealing in consequence assessment studies are presented. The results of these studies indicate that borehole seals with effective permeabilities greater than tens of darcies would result in doses to maximally exposed individuals of less than 0.01% of natural background. (ERA citation 05:023744)

UCID-18651 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Application of FRAMIS to K/sub D/ Data.
N. Storch. 20 Mar 80, 25p
Contract W-7405-ENG-48

This report documents an application of the FRAMIS relational data base management system. A geochemical data base of ion exchange distribution coefficients (K/sub D/) is created and maintained by using very simple commands. Reports are automatically generated. Familiarity with the LLL Octopus Time-Sharing System and FRAMIS is assumed. (ERA citation 05:023747)

UCRL-15228 PC **A06**/MF **A01**
International Engineering Co., Inc., San Francisco, CA.
Conceptual Design of Retrieval Systems for Emplaced Transuranic Waste Containers in a Salt Bed Depository. Final Report.
S. F. Fogleman. Apr 80, 110p
Contract W-7405-ENG-48

The US Department of Energy and the Nuclear Regulatory Commission have jurisdiction over the nuclear waste management program. Design studies were previously made of proposed repository site configurations for the receiving, processing, and storage of nuclear wastes. However, these studies did not provide operational designs that were suitable for highly reliable TRU retrieval in the deep geologic salt environment for the required 60-year period. The purpose of this report is to develop a conceptual design of a baseline retrieval system for emplaced transuranic waste containers in a salt bed depository. The conceptual design is to serve as a working model for the analysis of the performance available from the current state-of-the-art equipment and systems. Suggested regulations would be based upon the results of the performance analyses. (ERA citation 05:023750)

UCRL-15232 PC **A05**/MF **A01**
EA and T Co., Inc., Marina del Rey, CA.
Monitoring System Specifications: Retrieval of Surf from a Salt Repository.
Jan 80, 87p
Contract W-7405-ENG-48

The task of developing specifications for a reference monitoring system determined by repository environmental conditions, retrieval operations, and federal regulatory criteria is discussed. The monitoring system specified in this report is capable of measuring (1) package position and orientation, (2) vault deformation, (3) brine accumulation, (4) spent fuel dissolution, (5) temperature, (6) nuclear radiation, and (7) package condition with sufficient accuracy to provide data input to a general risk assessment model. In order to define a monitoring system which can provide probabilistic data on radiological risk to operating personnel and the general public for a salt mine repository, the following information is required: (1) a complete design of the salt SURF repository including inventory, density and waste package design details; (2) probalistic failure rate data on containment integrity of the SURF waste package; (3) probabilistic failure rate data on the monitoring system components (i.e., monitoring procedure, instrumentation, data acquisition, data processing and data interpretation). (ERA citation 05:023752)

UJV-4663-Ch MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Study of Phosphate Systems for High-Level Waste Solidification. Part I.
O. Vojtech, M. Santarova, I. Stejskal, and I. Suesmilch. Jan 79, 34p
In Russian.
U.S. Sales Only. Microfiche copies only.

The results of the investigation of the system fission products - corrosion products - sodium, in a phosphate matrix used as a medium for high-level wastes solidification are presented. Solidification products were obtained by the thermal treatment of the initial solutions of radioactive wastes (calcination and melting procedures) with only phosphoric acid as an admixture. Final solidification products were tested for their hydrolytic resistance and structure. Standard methods for leaching and dissolution were used; for the structural analysis most results were obtained by electron microprobe analysis. The orthogonal factorial analysis was used for the mathematical interpretation. (Atomindex citation 11:503134)

18H. Radioactivity

AAEC/E-473 PC **A02**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
AAEC Tritium List No. 3 1977-1978.
G. E. Calf, and R. C. Stokes. Jun 79, 20p
U.S. Sales Only.

Details are given of the concentration of the environmental isotope tritium in monthly precipitation samples taken at 16 stations, situated throughout Australia, during the period 1977-1978. (Atomindex citation 11:499475)

AAEC/E-476 PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Survey of the Maralinga Atomic Weapons Testing Range for Residual Plutonium Contamination.
W. R. Ellis. Jun 79, 42p
U.S. Sales Only.

Residual plutonium levels in soil, flora, fauna, and the air of the Maralinga (South Australia) Atomic

Weapons Testing Range are presented and discussed. It is shown that only on rare occasions (and possibly never) would the plutonium concentration in air from wind resuspended dust exceed the maximum allowable concentration for continuous exposure of the general public. In the case of artificially resuspended dust, this maximum concentration could be exceeded for short periods, but the accompanying dust level would be such that working conditions would be uncomfortable, if not intolerable. Potential hazards from other possible exposure routes are so low that they are of no consequence. (Atomindex citation 11:499897)

AD-A086 216/9 PC **A06**/MF **A01**
General Electric Co Santa Barbara CA Dasiac
Fallout Hazard Prediction Inconsistencies.
Final rept. 1 Oct 78-1 Oct 79,
Howard A. Hawthorne. 1 Oct 79, 109p Rept no. DASIAC-SR-174
Contract DNA001-79-C-0081

An elementary review of modelling of fallout processes is presented, with lists of some of the important variables that modules within models are called on to parameterize. A brief historical synopsis of the development of modelling includes a description of efforts with a standardized input data to produce output directly comparable among models, including illustrations of the output over the nuclear yield range of less than 1 KT to 15 MT. Model output is compared to observed data from field weapons tests, and estimates are made of the degree of fit between observed nuclear data and predicted parameters from models. (Author)

AD-B951 748/3 PC **A02**/MF **A01**
General Electric CO Santa Barbara Ca Tempo
Operation WIGWAM. Project 2.2. Radiochemical Analysis of WIGWAM Debris.
1 Feb 80, 11p DOE-WT-1010(EX)
Contract DNA001-79-C-0455
Extracted version of report dated May 55, AD-361 830L.
Distribution limitation now removed.

Radiochemical analyses have been performed on four sea-water samples from Operation WIGWAM. The confining environment of the deep underwater explosion of this atomic weapon produced no unusual effects on relative yields of products, but it did appear to increase the efficiency of the burst. Fractionation of radioactive materials before collection did not seem to be serious.

AERE-R-9452 PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Environmental and Medical Sciences Div.
Resuspension of Particulate Matter from Grass and Soil.
J. A. Garland. May 79, 30p
U.S. Sales Only.

Measurements of resuspension of particulate matter from grassland and bare soil in Britain at controlled wind speeds are described in this report. The measurements were performed in an outdoor wind tunnel. Resuspension factors for a sub-micron powder deposited from the air on to 10m exp 2 of grass and soil and for a suspension of silt, sprayed on to a similar grass area, were similar. The resuspension factor declined as the reciprocal of time of wind exposure and increased as the square or cube of wind speed. An appreciable fraction of the resuspended tracer was in the respirable size range. A large fraction of the total material suspended from a small contaminated area deposited again within three metres. The strong dependence of deposition rates on particle size and the rapid deposition close to the source questions the extrapolation of small scale resuspension measurements to practical situations, suggesting that analysis of the concentrations of widely distributed tracers may usefully supplement resuspension measurements. Atmospheric concentrations of trace elements and the distribution of weapons fallout were used to deduce an upper limit for the resuspension factor for a fifteen year old deposit of 7 x 10 exp -11 m exp -1 . The fraction of deposited fallout resuspended during such a period cannot much exceed 10 per cent. (Atomindex citation 11:499486)

CEA-R-4965 PC **A09**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Size Distribution of Natural Aerosols and Radioactive Particles Issued from Radon, in Marine and Hardly Polluted Urban Atmospheres.
These,
G. Tymen. Mar 79, 187p
In French.
U.S. Sales Only.

With a view to studying the natural radioactive particles produced by atttachment of exp 222 Rn daughters on environmental aerosol particles, the behaviours of CASELLA MK2 and ANDERSEN cascade impactors were first investigated. Their characteristic stage diameters were determined and size distributions of airborne particles were obtained in various situations. Moreover, an experimental and automatic equipment for measuring radon was devised and a method was developed in order to evaluate RaA, RaB, RaC concentrations in the free atmosphere. A degree of radioactive desequilibrium between exp 222 Rn and its daughters, more important than that in other locations was thus demonstrated. Furthermore, by means of various aerosol collection systems (ion tubes, diffusion batteries, cascade impactors, filters), the cumulative size distribution of natural radioactivity was established in the air, at ground level. Finally, from a theory of attachment of small radioactive ions on atmospheric particles, a tentative explanation of experimental results was made. (Atomindex citation 11:502283)

CONF-791009-39 MF **A01**
Oak Ridge National Lab., TN.
Potential Health Effects of Radon-222 to the General Public from Uranium Milling.
C. C. Travis, and L. M. McDowell-Boyer. 1979, 4p
Contract W-7405-ENG-26
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.
Microfiche copies only.

This paper presents a discussion of the potential health risk that may result from present and future radon-222 releases at uranium mill tailings piles situated in the United States. These risks are contrasted with the health risk continually present as a consequence of background levels of radon-222 naturally present in the atmosphere. It is estimated that the current risk of lung cancer in the population due to uranium milling is less than 10 exp -4 times the natural risk. In addition, it is estimated that future risks due to mill tailings will be approximately a factor of 10 exp 5 lower than the natural radon-222 risk to the general public if stabilization of tailings piles is implemented. Thus, it appears the incremental population risk due to milling is insignificant with respect to the natural risk. (ERA citation 05:022957)

CONF-791103-108 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of Uncertainties in Selected Environmental Dispersion Models.
C. A. Little, and C. W. Miller. 1979, 4p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

Compliance with standards of radiation dose to the general public has necessitated the use of dispersion models to predict radionuclide concentrations in the environment due to releases from nuclear facilities. Because these models are only approximations of reality and because of inherent variations in the input parameters used in these models, their predictions are subject to uncertainty. Quantification of this uncertainty is necessary to assess the adequacy of these models for use in determining compliance with protection standards. This paper characterizes the capabilities of several dispersion models to predict accurately pollutant concentrations in environmental media. Three types of models are discussed: aquatic or surface water transport models, atmospheric transport models, and terrestrial and aquatic food chain models. Using data published primarily by model users, model predictions are compared to observations. (ERA citation 05:022958)

EMSL-LV-0539-33 PC **A08**/MF **A01**
Environmental Monitoring and Support Lab, Las Vegas, NV.
Soil Profiles of Mounds on Plutonium-Contaminated Areas of the Nevada Test Range Complex.
V. D. Leavitt. Jan 80, 158p
Contract EY-76-A-08-0539

This report describes soil profiles of the surface soils in mounds in two areas located on the Test Range Complex, Nye County, Nevada. Both areas have been the sites of aboveground nuclear safety tests. These areas are contaminated with plutonium and are the object of investigations regarding the movement of plutonium in the environment. (ERA citation 05:024641)

KEK-78-20 PC **A04**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Radiological Impact of High-Energy Accelerators on the Environment.
R. H. Thomas. Nov 78, 67p
U.S. Sales Only.

The potential radiological impact of high-energy, high-intensity accelerators in the environment is discussed. It is shown that there are three sources of radiation exposure to the general public resulting from the operation of high-energy accelerators. In order of importance these are (a) the prompt radiation field, produced when the accelerator is operating; (b) the release of radionuclides and aerosols into the atmosphere; and (c) the production of radionuclides in the groundwater system around the accelerator. Of these three sources, (a) is dominant and typically exceeds (b) by about an order of magnitude. To date, experience at many accelerator laboratories has shown that the quantity of accelerator-produced radionuclides released to nearby groundwater systems (c) is either extremely small or immeasurable. The population dose equivalent resulting from the operation of several large high-energy facilities is compared. (Atomindex citation 11:502607)

LA-8221 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Studies of Long-Term Ecological Effects of Exposure to Uranium V.
G. C. White, J. C. Simpson, and K. V. Bostick.
May 80, 26p AFATL-TR-79-101
Contract W-7405-ENG-36

Research performed by the Los Alamos Scientific Laboratory (LASL) for the Air Force Armament Laboratory, Eglin Air Force Base, Florida, is reported. A statistical technique called kriging was used to analyze the uranium concentrations in surface soil at E-F Site (LASL). Kriging provided a much more realistic contour surface for uranium concentrations than either a polynomial trend analysis or contouring the original data. The major advantages of kriging are that a measure of the uncertainty of the contoured surface is provided, and that the nonparametric nature of the method allows very irregular surfaces to be fitted. A function relating the uranium counting efficiency of the phoswich portable survey instrument to ambient temperature (10 to 30 exp 0 C) was developed. Counting efficiency is maximum at approximately 10 exp 0 C and declines significantly at higher sample temperatures. The counting efficiency of the phoswich was not affected by soil moisture or relative humidity. (ERA citation 05:024647)

ORNL/TM-6874 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
User's Manual for DWNWND: an Interactive Gaussian Plume Atmospheric Transport Model with Eight Dispersion Parameter Options.
D. E. Fields, and C. W. Miller. May 80, 39p
Contract W-7405-ENG-26

The most commonly used approach for estimating the atmospheric concentration and deposition of material downwind from its point of release is the Gaussian plume atmospheric dispersion model. Two of the critical parameters in this model are sigma/sub y/ and sigma/sub z/, the horizontal and vertical dispersion parameters, respectively. A number of different sets of values for sigma/sub y/ and sigma/sub z/ have been determined empirically for different release heights and meteorological and terrain conditions. The computer code DWNWND, described in this report, is an interactive implementation of the Gaussian plume model.

This code allows the user to specify any one of eight different sets of the empirically determined dispersion paramters. Using the selected dispersion paramters, ground-level normalized exposure estimates are made at any specified downwind distance. Computed values may be corrected for plume depletion due to deposition and for plume settling due to gravitational fall. With this interactive code, the user chooses values for ten parameters which define the source, the dispersion and deposition process, and the sampling point. DWNWND is written in FORTRAN for execution on a PDP-10 computer, requiring less than one second of central processor unit time for each simulation. (ERA citation 05:024633)

ORNL-5583 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Integrated Assessment of the Phosphate Industry.
M. T. Ryan, and S. J. Cotter. May 80, 101p
ORNL/EV/OTI-2001
Contract W-7405-ENG-26

The phosphate industry in the United States includes three major activities, namely, mining and milling of phosphate rock, phosphate product manufacture, and phosphate product use. Phosphatic materials contain uranium, thorium, and their decay products in greater than background amounts. This assessment of the radiological impacts associated with the redistribution of radioactive components of phosphate materials may provide insight into the effects of uranium extraction from phosphate materials for use in the nuclear fuel cycle. (ERA citation 05:022973)

RFP-ENV-79 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Annual Environmental Monitoring Report, January-December 1979.
R. D. Howerton. 10 Apr 80, 48p
Contract AC04-76DP03533

This report documents the 1979 environmental surveillance program at the Rocky Flats Plant, as conducted by the Environmental Analysis Section of the Environmental Sciences Branch. Sample analyses are performed by the Health, Safety, and Environmental Laboratories of the Health, Safety, and Environment Department and by the General Laboratory of the Quality Engineering and Control Department. The report includes an evaluation of Plant compliance with all appropriate guides, limits, and standards. Potential public radiation dose commitments were calculated from average radionuclide concentrations measured at the Plant property boundaries and in surrounding communities. (ERA citation 05:024646)

SCPRI-RM-10-1978 PC **A02**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Monthly Measurement Tables.
Oct 78, 25p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment are presented (see also the SCPRI-RT-4-1978 report). (Atomindex citation 11:499862)

SCPRI-RM-11-1978 PC **A03**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Monthly Measurement Tables.
Nov 78, 26p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment are presented (see also the SCPRI-RT--4-1978 report). (Atomindex citation 11:499863)

SCPRI-RM-4-1978 PC **A03**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Progress Report. Details of the Monthly Results of Measurements.
Apr 78, 26p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment are presented (see also the SCPRI-RT--2-1978 report). (Atomindex citation 11:499856)

SCPRI-RM-5-1978 PC **A02**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Progress Report. Details of the Monthly Results of Measurements.
May 78, 25p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment are presented (see also the SCPRI-RT--2-1978 report). (Atomindex citation 11:499858)

SCPRI-RM-9-1978 PC **A03**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Monthly Measurement Tables.
Sep 78, 31p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment are presented (see also the SCPRI-RT--3-1978 report). (Atomindex citation 11:499860)

SCPRI-RT-3-1978 MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
3. Quarterly Progress Report, 1978.
1978, 19p
In French.
U.S. Sales Only. Microfiche copies only.

This report of the SCPRI exposes an interpretation of the principal results concerning the surveillance of radioactivity in the environment: atmospheric dusts, rainwater, surface water, underground water, irrigation water, drinking water, food chain, sea water around nuclear plant sites and other sites. The activities of various radioisotopes are presented in tables (exp 7 Be, exp 95 Zr and exp 95 Nb, exp 103 Ru, exp 131 I, exp 137 Cs, exp 140 Ba and exp 140 La, exp 90 Sr, exp 106 Ru and exp 106 Rn, exp 226 Ra, exp 54 Mn, U and T). A bibliographic selection is also presented. (Atomindex citation 11:499857)

UCRL-83583 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Numerical Simulation of Self-Induced Rainout Using a Dynamic Convective Cloud Model.
C. R. Molenkamp. Mar 80, 5p CONF-800708-1
Contract W-7405-ENG-48
International conference on cloud physics, Clermont-Ferrand, France, 15 Jul 1980.

The hypothesis that self-induced rainout can occur is supported by observations in Hiroshima and Nagasaki, where deposition of weapons debris with precipitation occurred several km downwind of the burst point. This precipitation was initiated either directly by the nuclear weapons or by the ensuing fires. Simulation of the Nagasaki event with a convection cloud precipitation scavenging model, although fraught with many questionable assumptions, agrees surprisingly well with the observations and supports the hypothesis that self-induced rainout can occur. (ERA citation 05:024635)

18I. Reactor Engineering and Operation

AD-A085 861/3 MF **A01**
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
Numerical Study of Formation of Thermal Non Uniformities in Active Packed Beds.
Final rept.,
Myron Hill, and J-M Buchlin. Jun 78, 84p VKI-1978-12, EOARD-TR-79-1
Grant AFOSR-78-3584
Availability: Document partially illegibile.

The purpose of this work was to mathematically model the heat transfer in an active bed heat exchanger and to develop an appropriate numerical scheme for the solution of the temperature field. As active packed beds are being considered for use in nuclear reactors, concern is generated as to whether regions of relatively high temperatures will develop. Such concern is the impetus behind the application of the program to two applications concerning heat transfer in packed beds assuming variable porosity of the Brosilow type and the existence of blockages. The results show that for the case of a packed bed with the porosity distribution the so-called hot spot occurs near the wall of the bed. Its magnitude and position were seen to be strongly affected by the assumed velocity profile and wall boundary conditions. In addition, as the proposed mathematical equations include axial conduction as opposed to a previously developed program which excluded axial conduction and as the results of the two programs approached one another as the Re increased, it is reasonable that the previous program (as it is based on parabolic, not elliptic equations as in the present case) could be implemented with little error expected due to the lack of axial conduction.

AED-Conf-77-498-005 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Refuelling and Other Special Operations.
R. Boedege. 1977, 35p CONF-7709147-18
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only. Microfiche copies only.

The first part deals with the criteria and the calculational methods and procedures in establishing reload and control rod patterns for a given operating time and load. Special consideration will be given to the interdependence of enrichment and the burn-up of the discharged fuel (for a BWR). In the second part the sequences in discharging and loading fuel are explained, and the necessary tests and checks for the control rod movement, the reactivity control, and the shut-down-margin will be discussed. The adaption of the codes to processing the in-core-data is important in monitoring the core's behaviour and in improving the control rod schedule. Lastly, the transport of irradiated fuel on- and off-site and the relevant technical and administrative rules and methods to be observed and/or applied in accomplishing all the tasks in a safe manner are elucidated. (Atomindex citation 09:383453)

AEEW-M-1689 PC **A03**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Calculations of Edwards' Pipe Blowdown Tests Using the Code TRAC P1.
R. O'Mahoney. May 79, 31p
U.S. Sales Only.

The paper describes the results obtained using the non-thermal equilibrium LOCA code TRAC-P1 for two of a series of Pipe Blowdown Tests. Comparisons are made with the experimental values and RELAP-UK Mark IV predictions. Some discrepancies between prediction and experiment are observed, and certain aspects of the model are considered to warrant possible further attention. (Atomindex citation 11:500178)

BNL-NUREG-27185 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
OTSG Modeling for the Analysis of the TMI Incident.
C. J. Hsu, W. G. Shier, and M. M. Levine. 1980, 5p CONF-800607-23
Contract EY-76-C-02-0016
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The IRT code is a reactor plant systems code for the analysis of pressurized water reactor (PWR) transients that is being modified by Brookhaven National Laboratory for the Nuclear Regulatory Commission. A significant modification that has recently been implemented is a model for a once-through steam generator (OTSG) to enable simulation of Babcock and Wilcox (B and W) reactor transients. This paper describes the new OTSG modeling and presents the results of an analysis of

the initial phase of the TMI incident using this model. (ERA citation 05:022443)

BNL-NUREG-27191 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Calculation of the CANON Experiment Using the TRAC Code.
S. V. Lekach. 1980, 3p CONF-800607-22
Contract EY-76-C-02-0016
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

In order to focus on the ability of the TRAC code to predict critical discharge flowrates and water subcooling in a loss-of-coolant simulation, the TRAC-P1A version of the code has been applied to calculate the CANON experiments (Riegel and Marechal, 1977). The CANON experimental assembly consists of a horizontal 4.4 meter long pipe (10 cm I.D.) filled with pressurized (32 bar) subcooled water. Both ends of the pipe are closed off. The temperature of the water varied from 200 to 230 exp 0 C. The experiment consisted in suddenly opening one end of the pipe and recording the pressure as a function of time at several locations along the pipe and measuring the void fraction as a function of time at a location of 1.5 meters from the dead end. The void fraction measurements were done using a neutron scattering technique. A diaphragm is located at the broken end of the pipe with a variable diameter (30, 50, 70, 100mm) to slow down the ejection of water to about 5 seconds from 1 second (depending on the opening) in duration. (ERA citation 05:022444)

CEA-CONF-4438 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Comments on the Fomulation of the One-Dimensional Six Equations Two-Phase Flow Model.
G. Le Coq, J. Lewi, and P. Raymond. 1978, 15p
U.S. Sales Only.

The interpretation of many thermalhydraulic experiments related to the Loss of Coolant Accident, shows the interest of using a six first order partial-differential equation system, to describe the thermalhydraulic behaviour of two-phase flow. Such a model needs the knowledge of mass, momentum and energy transfers across the interface between liquid and gas. It is necessary to distinguish between two kinds of transfers: the first (which produce entropy at the interface) are called irreversible; while the last don't produce interfacial entropy and are called reversible. The irreversible transfers can be formulated using the theory of irreversible thermodynamics. The reversible transfers are now unknown. However, in the hypothesis of an homogeneous equilibrium flow, the transfers are only of the reversible form. Their formulation in a six equations model is deduced from degenerative criteria. These criteria are developped. A model without reversible terms is studied. Its characteristic roots permit the definition of a Mach number and, consequently, a critical flow which depends on the local values of the flow parameters in a cross section. However, such a criterium, is inadequate for engineering computation, and for the understanding of flow blockage phenomenon. The definition of a PSI function which depends on the Mach Number and all the transfers terms permits a better approach of this phenomenon. Finally the analysis of an air-water MOBY-DICK experiment is presented illustrate this purpose. (Atomindex citation 11:499830)

CEA-CONF-4494 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Experimental Work for SPIN Project.
P. Jover. 1978, 7p
In French.
U.S. Sales Only. Microfiche copies only.

The design of a sophistical system, such as SPIN (Systeme de Protection Integre Numerique) requires some preliminary experimental work. This paper describes the main devices which were build in order to check the options that were chosen during the project; this devices includes input-output modules, shared-memory module, asynchronous transmission module and one functional unit, devoted to the treatment of new algorithms for protection system. (Atomindex citation 11:500207)

CEA-CONF-4500 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Irradiation Devices Used in France to Study the Ramps.
R. Atabek, and G. de Contenson. 1978, 19p
CONF-7811161-1
In French.Meeting on load follow-on and ramping behavior of reactor fuel, Petten, Netherlands, 30 Nov 1978.
U.S. Sales Only. Microfiche copies only.

Within the study on the fuel-cladding interaction, the CEA had to build devices for carrying out ramps on the fuel rods of the light water reactor system. Four types of devices have been developed and are operational, namely the BOSS and CADENCES devices in the OSIRIS pile and the BOUFFON and AQUILON devices in the SILOE pile. The power ramps are made of three kinds of fuel rods: experimental fuel rods specially designed for studying the UO sub 2 -cladding interaction, and pre-irradiated in the core of the experimental piles up to fast doses of 1x10 exp 21 n/cm exp 2 (IRPHA and TIZ experiments); small rods made in a hot laboratory from long fuel rods from power reactors (FABRICE experiments); whole fuel rods not more than two metres long, previously irradiated in power reactors (PRISCA experiments). In the first part, the main characteristics of the four devices used for the ramps will be briefly recalled. In the second part, the complete diagram of a FABRICE re-irradiation in a BOSS device is given. All the operations are described from the fabrication in a hot laboratory to the results of the examinations after irradiation. (Atomindex citation 11:502848)

CEND-379(V.1) PC **A08**/MF **A01**
Combustion Engineering, Inc., Windsor, CT.
Conceptual Design of a Large Heavy Water Reactor for US Siting.
N. L. Shapiro, J. F. Jesick, A. T. Molin, and J. A. Daniel. Sep 79, 152p
Contract EN-77-C-01-5068

Information on the PHWR type reactor is presented concerning design characteristics; fuel management and resource utilization; economic evaluations; safety, licensing, and environmental impact; and commercial introduction. (ERA citation 05:022391)

CONF-791103-110 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Neutron and Fuel Cycle Kinetics Analogy.
P. J. Maudlin, and K. O. Ott. 1979, 7p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

An analogy between neutron kinetics and fuel cycle kinetics has been exploited to produce an elegant and accurate point reactor population model. This model can be readily applied for unconstrained fuel logistic and reactor scenario strategy studies, with trivial computational effort. Furthermore, this point kinetics model can form the basis for realistic scenario simulation by including energy demand and economic constraints. (ERA citation 05:024187)

CONF-791118-9 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Validation of Flux and Spectrum Predictions for a Pressure Vessel Wall Environment.
F. B. K. Kam. 1979, 30p
Contract W-7405-ENG-26
Water reactor safety research information meeting, Gaithersburg, MD, USA, 5 Nov 1979.

Aging light water reactor pressure vessels change their fracture toughness properties due to neutron fluence. In order to improve and standardize surveillance procedures for reactor pressure vessels the US Nuclear Regulatory Commission has established the LWR-PV Surveillance Dosimetry Improvement Program. This program is being conducted in close cooperation with several US and European Laboratories. Irradiations for this program are being performed at ORNL at the PCA-PV benchmark facility and the ORR-PV facility. (ERA citation 05:022428)

CONF-800226-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Response of EBR-II to a Complete Loss of Primary Forced Flow During Power Operation.
R. M. Singer, J. L. Gillette, D. Mohr, J. V. Tokar, and J. E. Sullivan. 1980, 14p
Contract W-31-109-ENG-38
Specialists meeting on decay heat removal and natural circulation in FBR's, Upton, NY, USA, 28 Feb 1980.

Detailed measurements of the thermal, hydraulic, and neutronic response of EBR-II to a complete loss of primary forced flow followed by a PPS-activated scram are presented. The experimental results clearly indicate a smooth transition to natural convective flow with a quite modest incore temperature transient. The accompanying calculations using the NATDEMO code agree quite well with the measured temperatures and flow rates throughout the primary system. The only region of the plant where a significant discrepancy between the measurements and calculations occurred was in the IHX. The reasons for this result could not be definitively determined, but it is speculated that the one-dimensional assumptions used in the modeling may not be valid in the IHX during buoyancy driver flows. (ERA citation 05:022445)

CONF-800403-14 MF **A01**
Oak Ridge National Lab., TN.
Review of Cladding-Coolant Interactions During LWR Accident Transients.
D. O. Hobson. 1980, 14p
Contract W-7405-ENG-26
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980, Portions of document are illegible.
Microfiche copies only.

Some of the coolant-cladding interactions that can take place during the design basis loss-of-coolant accident and the Three Mile Island loss-of-coolant accident are analyzed. The physical manifestations of the interactions are quite similar, but the time sequences involved can cause very different end results. These results are described and a listing is given of the main research programs that are involved in coolant-cladding interaction research. (ERA citation 05:022446)

CONF-800403-26 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
LWR Fuel Rod Behavior Observed During Postulated Accident Conditions: A Comparison of FRAP-T Calculated and PBF Experimental Results.
M. K. Charyulu, R. R. Hobbins, and P. E. MacDonald. 1980, 7p
Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Light water reactor (LWR) fuel rod behavior during transient experiments conducted in the Power Burst Facility is reviewed. The experiments examined simulated hypothetical reactivity initiated accidents (RIA) and power-cooling-mismatch (PCM) events. Fuel rod behavior calculated by the Fuel Rod Analysis Program-Transient (FRAP-T) is compared with the test data. Important physical phenomena observed during the tests and not presently incorporated into the FRAP-T code are: (a) fuel swelling in the radial direction due to fission gas effects, (b) UO sub 2 -zircaloy chemical interaction, and (c) loss of UO sub 2 grain boundary strength and fuel powdering. Additional models needed in FRAP-T to reflect the fuel behavior observed during the two types of transients are cladding thickness variation during an RIA, molten fuel movement and possible cladding-molten fuel thermal interaction during a PCM event, and in the case of breached rods, the effects of hydrogen pickup on cladding embrittlement. (ERA citation 05:022418)

CONF-800403-28 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Determination of Post-DNB and Post-BT Fuel Design Limits.
D. W. Croucher, and R. J. Loyd. 1980, 9p

Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Categories of light water reactor transients and the departure from nucleate boiling (DNB) and boiling transition (BT) fuel design limits in light water reactors are reviewed. These fuel design limits for reactor licensing may be overly conservative because experiments have shown that fuel rods do not fail and may not experience damage as a result of momentary operation in film boiling or dryout conditions. Damage to the fuel rod is strongly dependent on the peak cladding temperature and the length of time at that temperature durng the transient. Testing of two potential licensing fuel design limits is suggested: (a) fuel rod functional capabilities are retained and fuel system dimensions remain within operational telerances; and (b) cladding deformation is permitted, but no significant oxidation is allowed. Damage mechanisms which may affect post-DNB or post-BT operation of fuel rods are permanent rod bowing and pellet-cladding interaction. The data necessary to support a fuel design limit and a means of obtaining these data are outlined. (ERA citation 05:022447)

CONF-800403-29 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Automatic Ultrasonic Testing and the LOFT In-Service Inspection Program.
J. A. Hunter. 1980, 9p
Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

An automatic ultrasonic testing system has been developed which significantly improves the flaw indication detection and characterization capability over the capability of conventional volumetric examination techniques. The system utilizes an accurately located ultrasonic sensor to generate the examination data. A small computer performs and integrates control and data input/output functions. Computer software has been developed to provide a rigorous method for data analysis and ultrasonic image interpretation. The system has been used as part of an in-service inspection program to examine welds in thich austenitic stainless steel pipes in a small experimental nuclear reactor. (ERA citation 05:022386)

CONF-800403-30 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Application of Noise Analysis to Safety-Related Assessments and Reactor Diagnostics.
R. C. Dryter, and D. N. Fry. 1980, 8p
Contract W-7405-ENG-26
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Noise analysis methods were used to assess anomalous in-core temperature fluctuations at the Fort St. Vrain gas-cooled reactor and postaccident reactor conditions at Three Mile Island, Unit 2. In addition to these applications of noise analysis, the underlying technology is developed concerning (1) analytical methods for predicting noise signatures under postulated anomalous conditions, (2) techniques for on-line monitoring of boiling water reactor stability, (3) new methods for locating and characterizing loose or drifting metallic objects in reactor coolant systems, and (4) acquisition of baseline noise signatures for commercial pressurized water reactors. (ERA citation 05:022410)

CONF-800434-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
LWR Source Terms for Loss-of-Coolant and Core Melt Accidents.
A. P. Malinauskas, R. A. Lorenz, H. Albrecht, and H. Wild. 1980, 21p
Contract W-7405-ENG-26
CSNI specialist meeting on nuclear aerosols in reactor safety, Gatlinburg, TN, USA, 15 Apr 1980.

Fission product source terms for loss-of-coolant and core meltdown accidents in light water reactors are reviewed. The results presented in the Reactor Safety Study are summarized, and modifications of these results, due to more recent experimental studies, are described. (ERA citation 05:022448)

CONF-800607-11 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Fission Gas Induced Fuel Swelling in Low and Medium Burnup Fuel During High Temperature Transients.
K. Vinjamuri. 1980, 4p
Contract EY-76-C-07-1570
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The behavior of light water reactor fuel elements under postulated accident conditions is being studied by the EG and G Idaho, Inc., Thermal Fuels Behavior Program for the Nuclear Regulatory Commission. As a part of this program, unirradiated and previously irradiated, pressurized-water-reactor type fuel rods were tested under power-cooling-mismatch (PCM) conditions in the Power Burst Facility (PBF). During these integral in-reactor experiments, film boiling was produced on the fuel rods which created high fuel and cladding temperatures. Fuel rod diameters increased in the film boiling region to a greater extent for irradiated rods than for unirradiated rods. The purpose of the study was to investigate and assess the fuel swelling which caused the fuel rod diameter increases and to evaluate the ability of an analytical code, the Gas Release and Swelling Subroutine - Steady-State and Transient (GRASS-SST), to predict the results. (ERA citation 05:022450)

CONF-800607-14 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Fuel Rod Stored Energy Estimates for the LOFT LOCA Tests.
E. L. Tolman, W. E. Driskell, and E. W. Coryell. 1980, 5p
Contract EY-76-C-07-1570
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Loss-of-coolant accident (LOCA) tests performed in the Loss-of-Fluid Test (LOFT) Facility provide an important data base for verification of thermal-hydraulic computer models. An important parameter which must be known for LOCA model evaluation is the initial fuel rod stored energy prior to initiation of a LOCA test. While fuel rod surface temperatures are measured in the LOFT tests, pellet internal temperatures are not; thus, the fuel stored energy must be estimated via computer predictions. A method has been evaluated to estimate fuel rod stored energy in the LOFT experiments based on the measured post-critical heat flux (CHF) cladding temperature rise. This summary compares the stored energy as determined using the post-CHF cladding temperature evaluation to that calculated from best-estimate fuel code predictions for LOFT LOCA Tests L2-2 and L2-3. These tests simulated a large break in the reactor vessel inlet coolant pipe of a pressurized water reactor. (ERA citation 05:022451)

CONF-800607-20 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Radioactive Gas and Hydrogen Removal after a LOCE at the LOFT Facility.
J. W. McCormick-Barger, and K. C. Sumpter. 17 Dec 79, 5p
Contract EY-76-C-07-1570
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The use of a silver-zeolite halogen adsorber placed in series with a hydrogen catalytic recombiner and a cryogenic noble gas adsorber assembly constitutes a waste gas processing system (WGPS) capable of handling hydrogen and fission product gases following a Loss-of-Coolant Experiment (LOCE). This paper describes: the types and quantities of gases expected to be found at the facility after a failed-fuel LOCE; the purpose of the WGPS; and the general configuration and expected decontamination factors associated with the LOFT WGPS. (ERA citation 05:022429)

CONF-800607-5 PC **A02**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Reactors Div.
Influence of Control Rod Worth Interactions on LMFBR Control Systems Design.
J. A. Lake, R. V. Rittenberger, and R. W. Rathbun. 1980, 5p
Contract AC15-76CL02395
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

These design criteria are interpreted to define the reactivity worth requirements for the primary and secondary control systems in terms of the minimum control systems capability under faulted conditions which will assure that the reactor can be safely shut down. The faulted conditions are postulated to occur upon the simultaneous failure of one of the redundant safety control systems to scram, a stuck rod in the scramming system, and a reactivity insertion resulting from the uncontrolled withdrawal of the highest worth control rod inserted in the reactor. The resulting positive reactivity insertion from the rod runout envelopes other postulated operational faults and is imposed on the shutdown requirements of both the primary and secondary control systems. In order to determine the minimum shutdown capability, an evaluation is made of the worst combination of control rod runout (reactivity fault) and stuck rod worth. (ERA citation 05:022417)

CONF-800607-7 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Prediction of Quench and Rewet Temperatures.
F. S. Gunnerson. 1980, 16p
Contract EY-76-C-07-1570
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Many postulated nuclear reactor accidents result in high-temperature dryout or film boiling within the nuclear core. In order to mitigate potential fuel rod damage or rod failure, safe or lower fuel rod temperatures must be reestablished by promoting coolant/cladding contact. This process is commonly referred to as quenching or rewetting, and often, these terms are not differentiated. All theoretical predictions of the cooling process by various models based on single or multidimensional analytical and numerical studies require a knowledge of either the quenching or the rewetting temperature. The purpose of this paper is to define quench and rewet temperatures and present a method whereby each may be estimated. (ERA citation 05:022449)

COO-4261-14 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Growth of Molten Core Debris Pools in Concrete. Part II. A. Pool Growth in Composite Beds; B. Effect of Overlaying Steel Layers. Final Report, March 1, 1978-September 30, 1979.
S. I. Abdel-Khalik. 26 Dec 79, 47p
Contract EN-77-S-02-4261

The heat and mass transfer processes taking place in molten core debris/concrete systems have been experimentally investigated. Two types of experiments have been conducted. The first experiment simulates the growth of a molten debris pool in a composite sacrificial bed. This experiment models debris pool growth in an inner, low-melting point, sacrificial material zone followed by a melting attack on the concrete bed. The purpose of the inner zone is to quickly melt and dilute the debris pool so that its subsequent downward growth in the concrete may be slowed. In the second experiment a two-layer immiscible liquid system is volumetrically heated and allowed to melt into a low-density gas releasing solid bed which is miscible in the initially-higher-density bottom liquid. The solid melts, mixes with, and dilutes the bottom liquid pool until its density is lower than that of the top liquid. (ERA citation 05:024090)

CRBRP-GEFR-00465 PC **A03**/MF **A01**
General Electric Co., San Jose, CA. Advanced Reactor Systems Dept.
History of the Water Chemistry for the Few Tube Test Model.
S. A. Moss, and J. L. Simpson. Sep 79, 42p
Contract EY-76-C-03-0189-061

The water chemistry activities carried out in support of the Few Tube Test are described. This test was conducted to provide design confirmation data for the Clinch River Breeder Reactor Project (CRBRP) steam generators. Proposed CRBRP chemistry was followed; all volatile treatment (AVT) of water was carried out with on-line monitoring capability. (ERA citation 05:022397)

EGG-FM-5078 PC **A02**/MF **A01**
Department of Energy, Idaho Falls, ID. Idaho Operations Office.
Water Loss in Fast Project Interim Fuel Storage Rack.
P. V. Kelsey, Jr. Jan 80, 24p
Contract EY-76-C-07-1570

Water loss calculations for the concrete FAST interim fuel storage rack were performed at the request of Exxon Nuclear. Because water in concrete, whether chemically combined or in a free state, is a critical component for neutron attenuation and radiation shielding, loss of water within a concrete structure designed to contain various forms of nuclear material could present a criticality problem within the structure. Although a definitive optimum water content has not been presented at this time, it appears that 4 weight % is a minimum content for efficient attenuation. Although other elements in concrete contribute to neutron attenuation, hydrogen with its large cross section is the dominant attenuating element. The results of calculations indicate that the present design of the fuel rack is inadequate for the proposed total fluence and that the minimum safe water content would be reached within one year's operation. (ERA citation 05:024092)

EGG/LTR-20-69 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experimental Data Report of Heater Rod Test Series B-TC.
D. J. Barnum, C. W. Solbrig, and H. S. Selcho. 9 Jan 80, 57p
Contract EY-76-C-07-1570

Tests were performed on low-power, zircaloy clad, electrically heated rods at the Blowdown facility located at the LOFT Test Support Facility, (LTSF). Testing consisted of two parts, steady state and blowdown-reflood testing. Initial test conditions were as close to Loss-Of-Fluid-Test (LOFT) as practical. Test objectives were to: (a) develop and evaluate techniques for embedding thermocouples into zircaloy sheaths of nuclear fuel and electrical heater rods, (b) gain operating experience with the Blowdown facility, and (c) evaluate the performance of LOFT cladding surface thermocouples during simulated Loss-Of-Coolant-Accident (LOCA) conditions. (ERA citation 05:022436)

EGG-2006 PC **A06**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Low-Order Model of the Loss-of-Fluid Test (LOFT) Reactor Plant for Use in Kalman Filter-Based Optimal Estimators.
J. L. Tylee. Jan 80, 111p
Contract EY-76-C-07-1570

A low-order, nonlinear model of the Loss-of-Fluid Test (LOFT) reactor plant, for use in Kalman filter estimators, is developed, described, and evaluated. This model consists of 31 differential equations and represents all major subsystems of both the primary and secondary sides of the LOFT plant. Comparisons between model calculations and available LOFT power range testing transients demonstrate the accuracy of the low-order model. The nonlinear model is numerically linearized for future implementation in Kalman filter and optimal control algorithms. The linearized model is shown to be an adequate representation of the nonlinear plant dynamics. (ERA citation 05:013596)

EPRI-NP-1313 PC **A04**/MF **A01**
Technology for Energy Corp., Knoxville, TN.
Acoustic Monitoring of Relief Valve Position.
W. F. Hartman. Feb 80, 52p

A series of tests to establish the feasibility of monitoring relief valve positions using acoustic sensors is described. The sensors respond to noise generated when steam flows through the valve. Six types of safety and relief valves commonly used in light water reactor plants were instrumented and actuated under simulated plant conditions. In addition, background noise was measured in both pressurized water reactor plant and a boiling water reactor plant so that relative signal levels (valve open versus valve shut) could be determined. Results show that acoustic levels with the relief valves open are from one hundred to one thousand times greater than the levels with the valves shut, depending upon the valve type. Data are presented that will help system designers predict the acoustic levels that will be encountered when a relief valve opens. (ERA citation 05:024043)

ESG-DOE-13310 PC **A04**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Fast Reactor Fluence Dosimetry. Technical Progress Report, October 1978-March 1979.
B. M. Oliver, J. G. Bradley, and H. Farrar, IV. 15 Feb 80, 64p
Contract AT03-76SF75028

Information is presented concerning the development and performance testing of helium accumulation fluence monitors and the measurement of helium distribution in irradiated unfueled Type 316 stainless steel fuel cans. (ERA citation 05:022398)

ESG-DOE-13313 PC **A04**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Fast Reactor Fluence Dosimetry. Technical Progress Report, April-September 1979.
J. G. Bradley, B. M. Oliver, and H. Farrar, IV. 31 Mar 80, 51p
Contract AT03-76SF74028

Information is presented concerning the development and performance testing of helium accumulation fluence monitors. (ERA citation 05:022399)

FEI-660 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Calculation of Critical Heat Flux in Water Channels with Simple and Complex Configurations Using Freon Data.
L. M. Gorban, V. V. Pashichev, and R. S. Pomet'ko. 1976, 22p
In Russian.
U.S. Sales Only. Microfiche copies only.

The article deals with the results of the experimental research of the critical thermal stress on freon-12 for circular tubes and clusters of fuel elements. The experiments on the tubes have been carried out within the following range of the operational and geometric parameters : P = 10.8 - 31.1 atm; length of the tube L = 0.5 - 5 m; weight speed W gamma = (2.7 - 18)x10 exp 6 kg3m exp 2 xh; tsub(in)15 - 80 deg C; tube diameter D = 8;12 mm. Drawn is a comparison between the relationships referring to the heat transfer crisis for water and freon-12. The optimum values of the recalculation factors for estimation of the flow rates at various pressures are determined. A method is suggested for determination of the recalculation factors, which is based only of the thermal-physical properties of both fluids. The general nature of the suggested recalculation method with respect to various coolants and various operating conditions is established. The use of the recalculation factors for determination of the flow rates Ksub(G) = 1.3 for the tubes and Ksub(G) = 1.0 for the round rod bundles within the investigated range of the parameters ensures adequate accuracy (sigma < 10%) of recalculations of the data from freon to water. (Atomindex citation 10:433389)

GA-A-15687 PC **A09**/MF **A01**
General Atomic Co., San Diego, CA.
Pebble Bed Reactor Review Update. Fiscal Year 1979 Annual Report.
Jan 80, 192p
Contract AT03-76ET35300

Updated information is presented on the Pebble Bed Reactor (PBR) concept being developed in the Federal Republic of Germany for electricity generation and process heat applications. Information is presented concerning nuclear analysis and core performance, fuel cycle evaluation, reactor internals, and safety and availability. (ERA citation 05:022390)

GEFR-SP-00183 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Influence of the Main Condenser on SHRS Reliability.
J. G. Elerath. 21 Dec 79, 6p CONF-800607-4
Contract EY-76-C-03-0893-032

American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Upon shutdown of a Large Breeder Reactor, decay and latent heat must be removed to keep core temperatures below specified design limits. Usually this function will be performed using the plant's main condenser as the heat sink. If it is not available, however, heat can be removed by an auxiliary Shutdown Heat Removal System (SHRS). In support of the DOE/RRT Safe Shutdown Reliability Program, quantitative reliability studies were performed to investigate the relationships among various auxiliary SHRS configurations and the main condenser. The results of these studies show that the relative reliabilities achieved are a strong function of the auxiliary configurations selected; also that credit for the main condenser has significant reliability benefits in certain cases. (ERA citation 05:022402)

GEFR-SP-198 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Measurement of Irradiation Creep in Bending.
A. J. McSherry, J. Marshall, and M. R. Patel. 31 Jan 80, 6p CONF-800607-25
Contract AT03-76SF71031
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The major deformation modes in LMFBR fuel channels are bowing caused by neutron flux and temperature gradients and dilation due to stresses imposed by the flowing sodium. In both cases, the stress state of interest is bending. The bulk of irradiation creep data has been generated by simply loaded specimens such as tensile or biaxial pressurized tubes but it is questionable whether this data can be used to predict creep in bending. An irradiation creep experiment using beams loaded in primary bending has been designed to investigate this premise. (ERA citation 05:022400)

IAE-2785 MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Short Description and Instructions to the Program for Temperature and Velocity Field Calculation.
M. D. Segal. 1977, 13p
In Russian.
U.S. Sales Only. Microfiche copies only.

Given are a short description and an instruction to the programme of calculating temperature and velocity fields. Considered is the flux in a cluster of heat-generating bars as in a tube with bulk energy and friction sources. The flux is described with a system of three-dimensional non-linear equations of the parabolic type. The solution is found in each of the nodes of a spatial radially-azimuthal grid. The number of layers along the cluster does not exceed 50. The number of nodes in the cross section is limited in complience with the relation M exp 2 N(<=)1450, where M is a number of steps over the azimuth, N - a number of steps over the cluster radius. All thermal physical properties of the coolant depend on the temperature. The constant libraries for helium and air are envisaged, with the possibility of introducing thermal physical constant for other gases as well. The computer type is BEhSM-6. The necessary memory volume - the programme operates with a fictitious extended memory only. The programme language is FORTRAN. The operation system is "Dubna". Presented is a list of the incoming and outgoing information and the description of main subprogrammes. (Atomindex citation 10:437700)

JAERI-M-8010 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
JPDYN-IV: A Computer Code for JPDR-II Dynamics Analysis.
M. Yokobayashi, M. Ishizuka, A. Kishi, and Y. Wakabayashi. Dec 78, 121p
In Japanese.
U.S. Sales Only.

The computer code JPDYN-IV developed is for analyzing dynamic characteristics of the JPDR-II BWR plant. It treats transient phenomena caused by various perturbations in normal operation of the reactor plant. The code features (1) a void map

scheme to take into consideration the effect of a non-uniform void fraction distribution, (2) the treatment of a pressure change due to behavior of the stagnant water, and (3) a set of algebraic equations for analytical estimation of the flow rate in each region. Performance of the code was examined by way of the measured data in commissioning test of the JPDR-II up to 50% power. In the transient behavior caused by small perturbations, the calculated results agree well with the measured ones. For large perturbations, though the data are limitted, the agreement between calculation and measurement shows wide applicability of the code. (Atomindex citation 11:502881)

JAERI-M-8031 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Capacity Determination of Copper Oxide Fixed Bed Purifying Helium Coolant of HTGR.
H. Tone. Jan 79, 13p
In Japanese.
U.S. Sales Only.

The design of a copper oxide fixed bed to remove hydrogen from the helium coolant of HTGR has been studied. In the helium coolant purification system consisting of copper oxide fixed bed, the hydrogen is converted into water by the copper oxide, and the resultant water in the helium coolant can be removed by moisture absorber in the system. The oxidation of hydrogen by copper oxide is a gas-solid contact reaction. From the result that the gas film mass transfer coefficient of hydrogen is much larger than the reaction rate constant on the copper oxide surface, it is assumed that the rate determining step of the reaction is the oxidation process of hydrogen on the copper oxide surface, and not the mass transfer through the gas film. The oxidation process of hydrogen in the copper oxide fixed bed is similar to that in an ordinary catalyzer fixed bed. It is different from the reaction of solid state catalyzer only in that the CuO/Cu ratio in the copper oxide fixed bed decrease with increasing the conversion of hydrogen to water, and the reaction rate of hydrogen with copper oxide decreases slowly as the time proceeds. In this report, capacity of the copper oxide fixed bed is determined by the mathematical treatment including the HRU (Height of Reaction Unit) concept used in design of a catalyzer fixed bed and the passage of HRU in the copper oxide fixed bed at a velocity proportional to the reduction rate of the copper oxide. (Atomindex citation 11:502969)

JAERI-M-8047 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Flow Reduction Transient Burnout in an Annular Test Section. Transient Flow Boiling under Atmospheric Pressure, (6).
T. Kuroyanagai, and T. Iwamura. Jan 79, 106p
In Japanese.
U.S. Sales Only. Microfiche copies only.

In order to understand the transient boiling phenomena during PCM (power-cooling-mismatch) in light water reactors, transient burnout experiments were performed using a vertical annular test section under atmospheric pressure. The gap between the electrically heated stainless steel tube and the outer glass shroud was 2.0 mm and 1.4 mm, and the heated tube outer diameter and length were 10 mm and 800 mm respectively. Experiment ranges were as follows. Heat flux: 0.65 -- 1.36 x 10 exp 6 kcal/hm exp 2 , inlet water temperature: 30 -- 76 exp 0 C, initial mass velocity: 2.4 -- 6.0 x 10 exp 6 kg/hm exp 2 , flow reduction time: 0.1 -- 68 sec, and flow reduction rate: 0.29 -- 752 cm/sec/sec. The experimental results showed that beyond a flow reduction rate of about 5 cm/sec/sec (1.4 mm gap) and about 1 cm/sec/sec (2.0 mm gap), burnout mass velocity became lower than the steady state one. When the flow reduction rates were further increased to 20 -- 40 cm/sec/sec or beyond, the burnout delay time became constant at about 0.4 sec. (Atomindex citation 11:502933)

JAERI-M-8076 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Studies on Chemical Decontamination of JRR-3 Primary Cooling System, No.1 (Decontamination by CAN DECON Process).
T. Kondo, S. Tanaka, T. Yoshijima, M. Shigemoto, and S. Iida. Feb 79, 33p
In Japanese.
U.S. Sales Only.

The primary cooling system of JRR-3 is contaminated with activated stellite metal powder from pump runner, uranium oxide from failed fuel and fission products and plutonium from the contaminant uranium. This makes JRR-3 maintenance difficult. The plan of upgrading JRR-3 is now in progress, which involves replacement of the core tank and primary cooling system. To make the reactor disassembly safe, chemical decontamination processes have been investigated. The CAN DECON process developed and approved for the CANDU reactor in CANADA, a heavy water reactor similar to JRR-3 is possibly the most suitable. In this report are described feasibility of the CAN DECON process to the JRR-3 primary cooling system and the decontamination tests made with sludge collected from the primary system. The process is found to be effective and economical for the decontamination of uranium, fissionn products and plutonium, but not for stellite metal. (Atomindex citation 11:502987)

JAERI-M-8087 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effects of Initial Gap Width on the Fuel Failure Behavior under a RIA Condition, (1). Initial GAP Width Parameter Tests in the NSRR Experiments.
S. Saito, K. Ishijima, S. Tanzawa, S. Shiozawa, and N. Onishi. Feb 79, 42p
In Japanese.
U.S. Sales Only.

This report describes the results of initial gap width parameter tests. Three different types of fuel rod whose initial gap widthes are 0.195 mm, 0.095 mm, and 0.050 mm, respectively, were used in the tests. The following conclusions can be derived through the tests. (1) The gap width has significant influences on the onset of DNB(Departure from Nucleate Boiling). The threshold energy depositions for the onset of DNB are about 180 cal/g.UO sub 2 for the fuel rod with initial gap width of 0.195 mm, about 140 cal/g.UO sub 2 for 0.095 mm and about 110 cal/g.UO sub 2 for 0.050 mm. These threshold energy depositions seem to be almost equal to the energy depositions at which the fuel pellet comes in contact with cladding tube due to the thermal expansion and/or cracks of pellet. (2) The maximum cladding surface temperature does not depend so much on the initial gap width at the energy deposition of 200 cal/g.UO sub 2 or more. At the energy deposition of more than 200 cal/g.UO sub 2 , the heat transfer mode on the cladding surface becomes mainly film boiling heat transfer for all the cases of three different initial gap widthes, and its heat transfer coefficient considerably small. Therefore, it is supposed that the cladding surface temperature is not so much controlled by the gap heat transfer but strongly by the heat transfer on the cladding surface. (3) The threshold energy deposition for fuel failure has a tendency to increase with the increase of the initial gap width. However, it is not much significant, and the deviation of the threshold energy deposition for fuel failure from that of about 260 cal/g.UO sub 2 for the standard gapped fuel rod with the initial gap width of 0.095 mm is within 10 cal/g.UO sub 2 for the wide and narrow gapped fuel rods. Any difference is not observed in the fuel failure mechanism for these different types of fuel rod. (Atomindex citation 11:502939)

JAERI-M-8166 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Implementation of the Thermal-Hydraulic Transient Analysis Code RELAP4/MOD5 and MOD6 on the FACOM 230/75 Computer System.
A. Kohsaka, T. Ishigai, T. Kumakura, and K. Naraoka. Mar 79, 66p
In Japanese.
U.S. Sales Only.

Development efforts have continued on the extensively used LOCA analysis code RELAP-4, as seen in its history; that is, from the prototype version MOD2 to the latest one MOD6 which is capable of one-through calculations from blowdown to reflood phase of PWR-LOCA. Many improvements and refinements of the models have enlarged the scopes and extents of phenomena to treat. Correspondingly the size of program has increased version to version, and special programming techniques have continuously been introduced to manage the program within limited capacity of core memory. For example, the Dynamic Storage Allocation of MOD5 and the PRELOAD Preprocessor newly incorporated in MOD6 are those designed for the CDC computer with relatively small core size. Described are these programming techniques in detail and experiences on implementation of the codes on FACOM 230/75, together with some results of confirmatory calculations. (Atomindex citation 11:503176)

KFK-2572 PC **A10**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit.
Experiments with Thermite Melts Performed in Concrete Crucibles.
D. Perinic, B. Kammerer, H. Knauss, A. Mack, and B. Stuka. Jul 79, 201p
In German.
U.S. Sales Only.

Within the frame of studies of hypothetical core meltdown accidents, combined with the interaction between concrete and the core melt, experiments were performed with thermite melts contained in concrete crucibles. In a test series comprising nine tests between 100 kg and 300 kg of thermite melt mass were given into concrete crucibles at initial temperatures of more than 2500 exp 0 C. To maintain the inherent stability the crucibles were reinforced by concrete steel or by a fiber glass fabric. The course of the reaction was recorded by measuring technology using an extensive instrumentation. As a result of the violent interaction between the melt and the crucible material the initial inner geometries got bulged radially and axially in the bottom part. The characteristic melting cavities so formed are mainly pear shaped. After separation they were measured in the meridional plane. (Atomindex citation 11:499842)

ND-R-324(R) PC **A02**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Establishment.
Evaluation of Pressure Drop V. Flow Rate Characteristics in the High Pressure Gas Loop at RNL.
M. W. Ashton, and G. M. Ellaby. Jul 79, 23p
U.S. Sales Only.

This report presents a detailed description of the High Pressure Gas Loop at RNL and its operation for the measurement of pressure drop v flow rate characteristics of test components. The computer analysis of the measured data is described and a typical Euler number v Reynolds number characteristic is included as an example. It is shown that the shape of the curve-fitted characteristic can be determined to better than +- 1% on Euler number; in line with the accuracy required in the setting of fast reactor sub-assembly flows. (Atomindex citation 11:502766)

NRCN(GP)-006 PC **A04**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
NRCN Publications in 1976. Titles, Abstracts and Authors.
M. Kuznietz, U. Wiener, and O. Israeli. Apr 77, 68p
In Hebrew.
U.S. Sales Only.

The front-pages of 35 works, written by employees of the Nuclear Research Center - Negev, and published in 1976 by the Publishing Department of its Scientific and Technical Information Service, as publications in the NRCN series or in the NRCN(ER), NRCN(ML), and NRCN(TN) subseries, are presented. The front-pages include the respective NRCN serial or sub-serial number, title, authors, date of publication, and abstract (and date of receipt, if substantially preceding the date of publication) in the original language (Hebrew or English). The front-page translations (into English or Hebrew), if published, are also included. Various data, concerning the NRCN publications in 1976, are given as well as alphabetical lists of authors (in Hebrew and Latin transliteration). (Atomindex citation 11:503190)

NRCN(GP)-008 PC **A04**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.

NRCN Publications in 1977. Titles, Abstracts and Authors.
M. Kuznietz, D. Makeveth, and O. Israeli. Sep 78, 69p
In Hebrew.
U.S. Sales Only.

The front-pages of 24 works, written by employees of the Nuclear Research Center - Negev, and published in 1977 by the Publishing Department of its Scientific and Technical Information Service, as publications in the NRCN series or in the NRCN(ER), NRCN(GP), and NRCN(TN) subseries, are presented. The front-pages include the respective NRCN serial or sub-serial number, title, authors, date of publication, and abstract (and date of receipt, if substantially preceding the date of publication) in the original language (Hebrew or English). The front-page translations (into English or Hebrew, respectively) are also included. Various data, concerning the NRCN publications in 1977, are given, as well as a list of all publications and alphabetical lists of authors (in Hebrew and Latin transliteration). (Atomindex citation 11:503191)

NUCLEBRAS-IPR-351 MF **A01**
NUCLEBRAS, Rio de Janeiro (Brazil). Diretoria de Tecnologia e Desenvolvimento.
Measuring Temperature Coefficient of TRIGA MARK I Reactor by Noise Analysis.
P. A. Soares. 1975, 89p PAR-GARA-040/75
In Portuguese.Thesis.
U.S. Sales Only. Microfiche copies only.

The transfer function of TRIGA MARK I Reactor is measured at power zero (5w) and power 118Kw, in the frequency range of 0.02 to 0.5 rd/s. The method of intercorrelation between a pseudostochasticbinary signal is used. A simple dynamic model of the reactor is developed and the coefficient of temperature is estimated. (Atomindex citation 10:430856)

NUREG/CR-1426 PC **A05**/MF **A01**
Battelle Columbus Labs. OH.
Development of a Mechanistic Model for ECC Penetration in a PWR Downcomer.
Topical rept.,
Aryeh Segev, and Robert P. Collier. Jun 80, 88p
BMI-2051
Contract NRC-04-76-293-04

A one-dimensional mechanistic model has been developed to describe the flow behavior of a liquid film draining down a heated wall, in the presence of countercurrent vapor flow. The effects of nonequilibrium void generation at the walls and condensation of countercurrent vapor on the penetrating liquid film interface, as well as on the bypassed liquid, have been considered. A correlation, based on Kutateladze parameter, was developed from air-water experiments in 1/15- and 2/15-scale models with standad and distorted geometries. Theoretical predictions were compared with over 600 test results, obtained in 1/15- and 2/15-scale models of a PWR downcomer, and with test L1-4 conducted in the LOFT facility. The comparisons exhibit fairly good agreement. When applied to a full scale PWR, the analysis predicts that ECC penetration would occur at a time shorter than the recommended licensing time delay.

NUREG/CR-1456 PC **A12**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experiment Data Report for Semiscale Mod-3 Small Break Test S-07-10 (Baseline Test Series).
Kenneth E. Sackett. May 80, 265p EGG-2035
Contract DOE-AC07-76IDO1570

Recorded test data are presented for Test S-07-10 of the Semiscale Mod-3 baseline test series. This is one of several Semiscale tests conducted to investigate the thermal-hydraulic phenomena resulting from a loss-of-coolant accident (LOCA) in a pressurized water reactor (PWR) system and to provide experimental data that can be used to assess the analytical capability of computer codes used in LOCA analysis. Test S-07-10 provided a data base for a Nuclear Regulatory Commission standard problem. The primary objective of Test S-07-10 was to experimentally characterize the thermal-hydraulic behavior of a system during a small break LOCA. Of special interest were the core uncovering characteristics and core thermal response which resulted from the slow depressurization. The purpose of this report is to make available the uninterpreted data from Test S-07-10 for future data analysis.

NUREG/CR-1511 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Containment Main Steam Line Break Analysis for Equipment Qualification.
Informal rept.,
D. E. Lamkin, A. Koestel, R. G. Gido, and P. W. Baranowsky. Jun 80, 65p LA-8305-MS

This study investigated the heat transfer boundary conditions that safety related equipment located in the containment might experience during a main steam line break (MSLB). In particular, bulk containment energy and condensed mass removal to passive heat sinks were studied. The boundary conditions for equipment located within the steam jet emanating from a MSLB are explored. A prescription for obtaining jet flow field parameters is also presented. This includes an accounting for the jet high underexpansion, normal shock, and the constant pressure portion. Several equipment qualification testing procedures are also recommended.

N80-26709/9 PC **A02**/MF **A01**
General Electric Co., Whetstone (England). Reactor Equipment Ltd.
Investigation of the Failure of an AC-3 Conduction Pump Duct.
G. Rowden. Jun 79, 15p REL/R(79)27

The failure of the duct in an AC-3 conduction pump after 3,000 hours service at 350/400 C in a high temperature sodium circuit, was investigated. Examination shows that failure resulted from gross overheating and local melting of the duct wall. It is concluded that failure probably resulted from operating the pump outside the recommended regime.

ORNL/TM-7215 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Economic Data Base for Alternative Nuclear Fuel Cycle Evaluations for US Electrical Utility Industry Conditions.
J. G. Delene, and H. I. Bowers. Apr 80, 33p
Contract W-7405-ENG-26

The evaluated economic data base used in the Nonproliferation Alternative Systems Assessment Program (NASAP) is presented. This data base contains information needed to evaluate alternative nuclear fuel cycles. This information includes unit cost estimates for the nuclear fuel cycle, capital investment and operation and maintenance costs, money costs and financial parameters, heavy-water costs, projections of US nuclear capacities, and key dates for alternative reactor/fuel system deployment. The sources of the data, tabulated in 15 tables, are discussed. (ERA citation 05:020637)

SAN-0115-T7 PC **A06**/MF **A01**
SRI International, Menlo Park, CA. Poulter Lab.
Nonequilibrium Phenomena in Flashing Water Used as an HCDA Source Simulant. Technical Report No. 8.
R. J. Tobin, D. J. Cagliostro, and A. L. Florence. Nov 79, 118p
Contract EY-76-C-03-0115-097

The philosophy behind the design of liquid metal fast breeder reactors (LMFBR) is to keep the risk to the public from accidental releases of radioactivity extremely small. Consistent with this philosophy, LMFBR safety technology research sponsored by DOE includes the consideration of hypothetical core disruptive accidents (HCDA). Recent scale-model simulation experiments on HCDAs identified nonequilibrium phenomena in flashing liquids as a possible attenuation mechanism in the energetics of flashing reactor fuels during an HCDA. (ERA citation 05:024096)

SAND-80-0217C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Debris Bed Experiment No. 4: A Preliminary Look.
J. Gronager. 1980, 14p CONF-800607-8
Contract EY-76-C-04-0789
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The experiment described is the fourth in a series of experiments designed to provide quantitative information on the behavior of debris beds formed from reactor materials following a core-melt accident. The D-series of experiments utilizes liquid sodium, particulate UO sub 2 (and in later experiments, stainless steel) to form debris beds which are fission heated, within the ACRR, to simulate fission-product heating of debris beds. The data obtained from the experiments will provide the basis of debris bed modeling in order to ascertain containment requirements. (ERA citation 05:022459)

SAND-80-0890C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Fire Protection Research Program at Sandia Laboratories.
L. J. Klamerus. 1980, 7p CONF-800403-16
Contract EY-76-C-04-0789
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Sandia Laboratories is executing a program for the Nuclear Regulatory Commission to provide data needed for confirmation of the suitability of current design standards and regulatory guides for fire protection and control in water reactor power plants. This paper summarizes the activities of this ongoing program through December 1979. Characterization of electrically initiated fires revealed a margin of safety in the separation criteria of Regulatory Guide 1.75 for such fires in IEEE-383 qualified cable. However, tests confirmed that these guidelines and standards are not sufficient, in themselves, to protect against exposure fires. This paper describes both small and full scale tests to assess the adequacy of fire retardant coatings and full scale tests on fire shields to determine their effectiveness. It also describes full scale tests to determine the effects of walls and ceilings on fire propagation between cable trays. (ERA citation 05:022461)

SRD-R-146 PC **A08**/MF **A01**
UKAEA Risley Nuclear Power Development Establishment, Culcheth (England). Safety and Reliability Directorate Culcheth.
Study of Common-Mode Failures.
G. T. Edwards, and I. A. Watson. Jul 79, 168p
U.S. Sales Only.

The purpose of the report is to investigate problems of the identification of the common failure mode (CFM) the reliability models used and the data required for their solution, particularly with regard to automatic protection systems for nuclear reactors. The available literature which was surveyed during the study is quoted and used as a basis for the main work of the study. The type of redundancy system under consideration is initially described and the types of CFM to which these systems are prone are identified before a general definition of the term 'common mode failure' is proposed. The definition and proposed classification system for CMF are based on the common cause of failure, so identifying the primary events. Defences against CFM are included and proposals for an overall strategy and detailed recommendations for design and operation are made. Common mode failures in US nuclear reactor systems, aircraft systems, and other sources including chemical plant systems are surveyed. The data indicates the importance of the human error problem in the causes of CMF in design, maintenance and operation. From a study of the collected data a redundancy sub-system model for CMF is developed which identifies three main categories of failure, non-recurrent engineering design errors, maintenance and test errors, and random interest events. The model proposed allows for the improvement in sub-system reliability where appropriate defences are applied. (Atomindex citation 11:502549)

UCID-18653 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technical Evaluation of the End-of-Cycle Recirculation Pump Trip for Duane Arnold Energy Center. (Docket No. 50-331).
L. R. Peterson. Mar 80, 16p
Contract W-7405-ENG-48

This report documents the technical evaluation of the end-of-cycle recirculation pump trip for the

Duane Arnold Energy Center. The review criteria are based on IEEE Std-279-1971, IEEE Std-323-1974, IEEE Std-338-1977, and General Design Criteria 13, 20 through 24, ad 29 of the Code of Federal Regulations, Title 10, Part 50, Appendix A requirements for determining the acceptability of the proposed system. (ERA citation 05:022388)

UJV-4576-T MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Effect of Configuration Distortion on Velocity and Temperature Fields in the Peripheral Zone of a Fast Reactor Fuel Assembly at Laminar Flow.
P. Milbauer. Nov 78, 25p
In Russian.
U.S. Sales Only. Microfiche copies only.

Calculations were performed of hydrodynamic and thermal characteristics for the peripheral zones of the BN-600 reactor fuel assembly. The distributions are shown of the tangential stress coefficient and of dimensionless thermal inhomogeneities along the fuel rod peripheries. The fundamental equations used in the calculations are reported. (Atomindex citation 11:502980)

UJV-4701-R,D MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Limits and Conditions for Continuous Operation of WWR-S Reactor.
P. Pittermann, and E. Listik. Feb 79, 26p
In Czech.
U.S. Sales Only. Microfiche copies only.

The fundamental technological and nuclear characteristics of the WWR-S reactor, safety limits and concepts of technical surveillance with particular attention to radiation safety of staff and of neighbouring population are outlined. The rules are mandatory for the reactor staff and for the users. The material is part of safety documentation for the WWR-S reactor. (Atomindex citation 11:502988)

18J. Reactor Materials

AEEW-M-1691 PC **A02**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Differential Option in LWR-WIMS.
M. J. Halsall. Apr 79, 14p
U.S. Sales Only.

In an LWRWIMS calculation of a fuel assembly, the user normally designates several fuel pins as being of the same type. If these pins are physically identical, and similarly situated with respect to poisons and water gaps this seems a reasonable thing to do. However, unless the pins so designated are symmetrically placed within the assembly they will in practice burn up at different rates so that at any given irradiation they will have different isotopic compositions and macroscopic cross sections. The simple option in LWRWIMS assumes that all pins designated to be of a certain type deplete at an appropriate average rate and therefore have equal cross sections at all irradiations. The original differential option which attempted to compensate for this approximation has been shown to have serious defects and a new method has been developed to replace it. The new differential option in LWRWIMS, in which each pin is depleted independently at a rate determined by the local flux and spectrum, is a significant improvement on the old method. It is conceptually simpler and therefore less prone to failure, it is particularly suited to calculating isotopic spatial distributions and it costs no more in computing time. (Atomindex citation 11:500155)

AGNS-47921-TPR-3 PC **A02**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
AFR/Design and Licensing Information/BNFP as a Model. Technical Progress Report, January-March 1980.
25 Apr 80, 15p
Contract AC09-79ET47921

Work on this project is focused on developing design and licensing information for the model facility. Three major subcontracts have been approved by DOE and the design effort is progressing satisfactorily on the security system, rack design, and the soils structural and seismic design which these contracts cover. Licensing activities are progressing satisfactorily. About 50% of the Environmental Report is drafted and issued for preliminary review. Approximately 15% of the Safety Analysis Report has been drafted. (ERA citation 05:023705)

BARC-1009 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Surface Reactions of Tellurium on Steel and Zircaloy 4.
M. S. Anand, and D. D. Pruthi. 1979, 6p
U.S. Sales Only.

The reaction between tellurium vapours and 316 stainless steel and zircaloy 4 surfaces has been studied in the temperature range of 823-1223 exp 0 K and 923-1273 exp 0 K respectively. The reaction product, thickness and the intergranular attack penetration was measured for the reaction of tellurium in 316 stainless steel. In the case of zircaloy 4 reaction product was brittle and scooped out. Hence the thickness of the individual bands could not be measured. It was observed that the reaction of tellurium on 316 stainless steel and zircaloy 4 resulted in the formation of two bands in both the cases. In the case of 316 stainless steel-tellurium reaction, the outer band was rich in iron and nickel while the inner band was rich in chromium, whereas in the case of zircaloy 4-tellurium, the outer band was rich in zirconium and the inner band contained tin in addition to zirconium. Tellurium was found in both the bands. (Atomindex citation 11:501940)

CEA-CONF-4499 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
CEA Experiments on the Transient Behavior of UO sub 2 -Zircaloy Fuels.
G. Lestiboudois, J. Delafosse, and P. Morize.
1978, 14p CONF-7811161-2
In French.Meeting on load follow-on and ramping behavior of reactor fuel, Petten, Netherlands, 30 Nov 1978.
U.S. Sales Only.

The study of the mechanical properties of Zircaloy claddings irradiated in pressurized water reactors has been carried out on a significant scale in France at the C.E.A. Zircaloy claddings possess minimum ductility for a fast integrated dose of around 10 exp 21 n/cm exp 2 , followed by a relatively significant increase. In this paper, the results already achieved are completed and a few recent examples will show the similarity that appears to exist between the change in ductility of the claddings and the aptitude of the fuel elements to withstand the power when the interaction phenomenon is being studied. (Atomindex citation 11:502957)

CONF-790707-36 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Implementation of the Engineering Safeguards Program (ESP) into Nuclear Fuel Recycle Facilities.
W. J. Armento, W. D. Box, R. E. Brooksbank, F. G. Kitts, and A. M. Krichinsky. 1979, 6p
Contract W-7405-ENG-26
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

The principal objective of ORNL-ESP is to demonstrate process monitoring as it might be accomplished by inspectors of any nuclear fuel recycle facility. Improved instrumentation and computer interfacing, currently being installed, provide the ORNL exp 233 U Pilot Plant with the capability of a dynamic volume balance in the solvent extraction system. Later, an accurate, (almost) instantaneous fissile mass balance will be routinely obtainable in the Pilot Plant. Subsidiary objectives include minimizing MUF/LEMUF, detecting material diversions, and alerting appropriate authorities in control of the facility in case of process anomalies. A continuing program will examine technology which might be utilized for facility design. Ultimately, process monitoring/control integrated with safeguards can convert the ORNL exp 233 U Pilot Plant into a partial safeguards demonstration facility. (ERA citation 05:023759)

CONF-791103-106 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Development of Nuclear Fuel Microsphere Handling Techniques and Equipment.
J. E. Mack, R. R. Suchomel, and P. Angelini.
1979, 26p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

Considerable progress has been made in the development of microsphere handling techniques and equipment for nuclear applications. Work at Oak Ridge National Laboratory with microspherical fuel forms dates back to the early sixties with the development of the sol-gel process. Since that time a number of equipment items and systems specifically related to microsphere handling and characterization have been identified and developed for eventual application in a remote recycle facility. These include positive and negative pressure transfer systems, samplers, weighers, a blender-dispenser, and automated devices for particle size distribution and crushing strength analysis. The current status of these and other components and systems is discussed. (ERA citation 05:022415)

CONF-791185-3 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Overview of Nuclear Fuel Cycle.
J. O. Blomeke. 1979, 32p
Contract W-7405-ENG-26
ANS student chapter seminar, College Station, TX, USA, 5 Nov 1979.

A broad, general look is given at the fuel cycle from an overall perspective. Covered are: BWR and PWR fuel characteristics, U mining and milling, enrichment, fuel fabrication, spent fuel reprocessing, handling and shipment, etc. Results of the International Fuel Cycle Evaluation are summarized. (ERA citation 05:023671)

CONF-800334-7 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Developments in Effluent Control for Breeder Reprocessing Facilities.
O. O. Yarbro, and M. B. Sears. 1980, 8p
Contract W-7405-ENG-26
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

10 CFR 20 and 40 CFR 190 impose tight restrictions on the releases of radioactive materials from the fuel cycle. Retention factors needed in the LMFBR and LWR fuel cycles to meet the 40 CFR 190 release limits of exp 85 Kr, exp 129 I, and exp 239 Pu are listed. Technologies for the control of I, exp 85 Kr, and tritium are discussed. Advanced effluent control systems will be demonstrated in the Hot Experimental Facility. (ERA citation 05:021873)

DOE/ER-0045/1 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Alloy Development for Irradiation Performance. Quarterly Progress Report for Period Ending December 31, 1979.
B. G. Ashdown. Apr 80, 182p
Contract W-7405-ENG-26

Progress is reported concerning preparation of a materials handbook for fusion, creep-fatigue of first-wall structural materials, test results on miniature compact tension fracture toughness specimens, austenitic stainless steels, Fe-Ni-Cr alloys, iron-base alloys with long-range crystal structure, ferritic steels, irradiation experiments, corrosion testing, and hydrogen permeation studies. (FS). (ERA citation 05:022638)

DOE/ET-0058/6 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Alloy Development for Irradiation Performance. Quarterly Progress Report for Period Ending June 30, 1979.
B. G. Ashdown. Apr 80, 112p
Contract W-7405-ENG-26

Progress is reported concerning preparation of a materials handbook for fusion reactors, ferritic stainless steels, fatigue crack growth testing, austenitic stainless steels, higher strength Fe-Ni-Cr alloys, reactive and refractory alloys, irradiation

studies, corrosion testing and hydrogen permeation. (ERA citation 05:022688)

DOE/TIC-11185 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Office of Fusion Energy.
Special Purpose Materials. Annual Progress Report, October 1, 1979.
Apr 80, 106p

Fusion reactor materials problems other than the first-wall and blanket structural materials are investigated. Components that are considered as special purpose materials include breeding materials, coolants, neutron multipliers, barriers for tritium control, materials for compression and OH coils and waveguides, grahite and SiC, heat-sink materials, ceramics, and materials for high-field (>10-T) superconducting magnets. Radiation-induced conductivity of three forms of Al sub 2 O sub 3 was measured as a function of ionizing dose rate and temperature. Increases observed are large enough to affect performance of insulators under some fusion reactor operating conditions. Single-crystal MgAl sub 2 O sub 4 was shown to exhibit zero swelling when irradiated to approx. 2 x 10 exp 26 n/m exp 2 at 925 and 1100 K. This ceramic is resistant to nucleation and growth of defect aggregates, and is not characterized by those microstructural conditions which lead to void formation and swelling in Al sub 2 O sub 3 . Fracture toughness of single-crystal Al sub 2 O sub 3 was significantly increased by elevated-temperature irradiation to approx. 2 x 10 exp 26 n/m exp 2 , while that for MgAl sub 2 O sub 4 and Y sub 3 Al sub 5 O sub 12 showed little or no change. These results show that ceramics can retain their original resistance to crack propagation after high-dose neutron irradiation. (ERA citation 05:022690)

ECN-74 PC **A06**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Effect of Neutron Irradiation on Sequential Creep-Fatigue Interaction of 18Cr-11Ni (DIN 1.4948) Stainless Steel Plate and Welded Joints at 823 K.
B. van der Schaaf, M. I. de Vries, and J. D. Elen.
Oct 79, 102p
U.S. Sales Only.

The effect of irradiation on sequential creep-fatigue interaction was studied for plate and welded joints of 18Cr-11Ni stainless steel DIN 1.4948, equivalent to AISI type 304. Irradiation and test temperature were 823 K, the neutron fluence amounted to 10 exp 23 n.m exp -2 (E > 0.1 MeV). Creep exposures lasted up to 4100 h. Low cycle fatigue testing was carried out with a total strain range of 0.6% and a strain rate of 3 x 10 exp -3 s exp -1 . The data are required for design and safety analysis of permanent structure such as: reactor vessel and shielded tank of the fast breeder reactor SNR-300. (Atomindex citation 11:502183)

FEI-867 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Hydrodynamic Study on Complicated Flow in Rod Assemblies with Wire Spacers (Electromagnetic Measuring Technique).
A. V. Zhukov, E. Ya. Sviridenko, N. M. Matyukhin, and K. S. Rymkevich. 1978, 17p
In Russian.
U.S. Sales Only. Microfiche copies only.

Stated are the results of investigation into longitudinal and transverse velocity components of liquid-metal flow (sodium-potassium alloy) in rod assemblies (s/d=1.23 and 1.4) with helical wire spacers of rods. Shown is a physical picture of the flow in the assembly with s/d=1.23, obtained by an electromagnetic transducer being moved within the assembly in longitudinal and transverse directions and measuring local characteristics of the complicated flow. Adduced are the data on coefficients of interchannel mixing in "extended" rod lattices with wire spacers. Basing on generalization of these data and results obtained earlier for "narrow" lattices of rods, a generalized formula is recommended for heat transfer coefficients in a wide range of determining parameters. The formula takes account of dependence of mixing coefficients on rod lattice pitch, spacer pitch and the Reynolds number. The results obtained testify to efficiency of using the electromagnetic method of measurements for investigation into complicated flow hydrodynamics in rod assemblies with wire spacers. (Atomindex citation 11:502774)

GEFR-SP-193 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Coolant Pressure Distribution in Wire-Wrapped Rod Bundles.
J. P. Wei. 11 Jan 80, 7p CONF-800607-17
Contract EY-76-C-03-0893-031
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

To analyze thermal-hydraulic behavior in a wire-wrapped fuel or blanket assembly, it is necessary to evaluate the coolant flow field in the rod bundle. Evaluation of the coolant flow phenomenon in the wire-wrapped assembly becomes even more important when the bundle has a low pitch-to-diameter ratio or a wire-wrap configuration different from the current reference straight-start design or the assembly is located in a high radial power gradient region in a reactor. Subchannel analysis method (FULMIX-II) was developed to specifically treat the complex coolant transfer process within a wire-wrapped assembly and to determine the coolant temperature field accordingly. (ERA citation 05:022416)

HEDL-TME-79-62 PC **A05**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Results from the Run-Beyond-Cladding Breach Irradiation of a Predefected Fuel Pin (RBCB-7).
D. C. Langstaff, M. Y. Almassy, and D. F. Washburn. Feb 80, 82p
Contract EY-76-C-14-2170

A slit was machined through the cladding of an irradiated fuel pin and irradiation in the Experimental Breeder Reactor-II (EBR-II) was resumed. The condition of the fuel pin was continuously followed with delayed neutron (DN) monitors. When the DN signal increased to a previously established administrative limit of 800 counts per second, the test was terminated. Postirradiation examination showed the sodium-fuel reaction caused fuel pin swelling and extension of the machined slit. There was no evidence of fuel washout nor was there any indiction of impending pin-to-pin failure propagation. This test supports an increase in DN signal for subsequent run-beyond-cladding-breach (RBCB) tests. (ERA citation 05:022403)

JAERI-M-8152 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Fretting Corroded Cladding Fuel Rod Tests in NSRR Experiments.
T. Yoshimura, M. Ochiai, T. Fujishiro, and M. Ishikawa. Mar 79, 26p
In Japanese.
U.S. Sales Only.

Fretting corroded cladding fuel rod tests have been performed as a part of the defective fuel rod test series in NSRR experiments. Fuel failure behavior and failure threshold energy of the fuel rod with such defective cladding were compared with those of the standard cladding fuel rod. Following are the primary results. 1) The fuel rods with small fretting defect exhibit a behavior typical of the standard cladding fuel rod. In the case of severely defected rods, however, the fuel failure threshold energy is slightly lower. 2) In the fretting corroded cladding fuel rod, violent failure accompanied with capsule pressure generation and mechanical energy production occurs at lower energy deposition than in the standard cladding fuel rod. (Atomindex citation 11:502913)

KR-155 PC **A04**/MF **A01**
Institutt for Atomenergi, Kjeller (Norway).
Data Recording and Processing System for Examination of Irradiated Fuel Rods. Description, User's Guide and Examples.
K. D. Olshausen, J. F. Christiansen, J. K. Larsen, and T. Stevens. Mar 78, 70p
U.S. Sales Only.

Over the past eight years a system has been developed at Institutt for Atomenergi, Kjeller, Norway, which helps to collect and analyze data obtained during certain post-irradiation examination techniques employed at IFA's Hot Laboratory. At present computer codes are in use for treating results from: profilometry, gamma scanning, eddy current testing, and tensile testing. The system is easily adaptable to any other measuring data with the structure: -axial position, time interval etc.; signal A (dc-voltage, counts); and signal B (dc-voltage, counts). An extension of the system for transverse gamma scanning and gap measurement (mechanical compression method) is planned for the future. The various programmes in the system are described and examples of the outputs are given in a series of appendices. (Atomindex citation 11:500186)

LA-UR-80-783 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Roy Reider (1914-1979) Selections from His Written and Spoken Words.
H. C. Paxton. 1980, 8p CONF-800431-3
Contract W-7405-ENG-36
Nuclear criticality safety topical meeting, El Paso, TX, USA, 8 Apr 1980.

Comments by Roy Reider on chemical criticality control, the fundamentals of safety, policy and responsibility, on written procedures, profiting from accidents, safety training, early history of criticality safety, requirements for the possible, the value of enlightened challenge, public acceptance of a new risk, and on prophets of doom are presented. (ERA citation 05:022784)

LA-UR-80-856 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Historical Perspective of Criticality Safety in the United States.
H. C. Paxton. 1980, 16p CONF-800431-1
Contract W-7405-ENG-36
Nuclear criticality safety topical meeting, El Paso, TX, USA, 8 Apr 1980.

The stages through which criticality safety has progressed are reviewed and speculation about present signs of maturity is made. Early history, evolution, and accident experiences are described. It is concluded that criticality safety as a discipline is mature. (ERA citation 05:022785)

LA-8131-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Analytical Methods for Fissionable Material Determinations in the Nuclear Fuel Cycle. Progress Report, October 1, 1978-September 30, 1979.
G. R. Waterbury. Mar 80, 32p
Contract W-7405-ENG-36

Work continues on the development of dissolution techniques for difficult-to-dissolve nuclear materials, the development of methods and automated instruments for plutonium, uranium, and thorium determinations, and the preparation of plutonium materials for the Safeguards Analytical Laboratory Evaluation (SALE) program and distribution by the National Bureau of Standards (NBS) as standard reference materials (SRMs). We are measuring the loner plutonium isotope half-lives, evaluating the isotope correlation techniques and the chemistry involved in the mass-spectrometric ion-bead techniques, and analyzing the SALE uranium materials. Completed subtasks include evaluations of various Teflon materials to recommend those acceptable for the dissolution apparatus developed at LASL, investigations of laser-enhanced dissolution of refractory materials, determinations of diverse ion effects on the microgram-sensitive method for determining uranium, fabrication of the first automated controlled-potential coulometric analyzer for determining plutonium, preparation of a exp 244 Pu material for distribution by NBS as a SRM, and determination of the half-life of exp 239 Pu. Work has been started on a spectrophotometric method for determining microgram quantities of plutonium, a microcomplexometric titration method for determining uranium, the use of new reagents for separations of plutonium, the preparation and packaging of a new lot of high-purity plutonium metal for distribution by NBS as a plutonium chemical SRM, and determination of half-lives of other plutonium isotopes. (ERA citation 05:021908)

NUREG/CR-0830 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.

Monitoring the Random Errors of Nuclear Material Measurements.
Technical rept.,
R. J. Brouns, F. P. Roberts, and J. A. Merrill. Jun 80, 40p PNL-3022

Monitoring and controlling random errors is an important function of a meaurement control program. This report describes the principal sources of random error in the common nuclear material measurement processes and the most important elements of a program for monitoring, evaluating, and controlling the random error standard deviations of these processes.

NUREG/CR-1284 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Methods of Determining and Controlling Bias in Nuclear Material Accounting Measurements.
Technical rept.,
R. J. Brouns, J. A. Merrill, and F. P. Roberts. Jun 80, 52p PNL-3264

The common sources of bias associated with measurements made for nuclear control and accounting purposes are described and recommended approaches to monitoring and controlling such errors are presented. Measurement bias is placed in perspective through a discussion of the effect of measurement error in material balance and accounting. A recommended program for monitoring and controlling bias includes calibrations, routine measurements of reference standards, method testing and comparative analyses.

NUREG/CR-1555 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Critical Experiments, Measurements, and Analyses to Establish a Crack-Arrest Methodology for Nuclear-Pressure-Vessel Steels.
Progress rept. Jun-Dec 79,
A. R. Rosenfield, I. Abou-Sayed, R. Gillot, M. F. Kanninen, and J. Jung. Jun 80, 43p BMI-2064
See also report dated Sep 79, NUREG/CR-0991.

Analyses of two kinds of crack arrest experiments have been carried out. The first case was a dynamic finite-difference analysis of tests on a photoelastic material carried out at the University of Maryland. Theory and experiments were shown to be in excellent agreement. The second case was a thermal-shock experiment (TSE-5) carried out by Oak Ridge National Laboratory. Agreement between theory and experiment was not as good here, possibly because the available data base was less detailed and because only an approximate dynamic analysis was carried out.

ORNL/TM-7239 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Stress Relaxation and Creep of High-Temperature Gas-Cooled Reactor Core Support Ceramic Materials: A Literature Search.
J. E. Selle, and V. J. Tennery. May 80, 37p
Contract W-7405-ENG-26

Creep and stress relaxation in structural ceramics are important properties to the high-temperature design and safety analysis of the core support structure of the HTGR. The ability of the support structure to function for the lifetime of the reactor is directly related to the allowable creep strain and the ability of the structure to withstand thermal transients. The thermal-mechanical response of the core support pads to steady-state stresses and potential thermal transients depends on variables, including the ability of the ceramics to undergo some stress relaxation in relatively short times. Creep and stress relaxation phenomena in structural ceramics of interest were examined. Of the materials considered (fused silica, alumina, silicon nitride, and silicon carbide), alumina has been more extensively investigated in creep. Activation energies reported varied between 482 and 837 kJ/mole, and consequently, variations in the assigned mechanisms were noted. Nabarro-Herring creep is considered as the primary creep mechanism and no definite grain size dependence has been identified. Results for silicon nitride are in better agreement with reported activation energies. No creep data were found for fused silica or silicon carbide and no stress relaxation data were found for any of the candidate materials. While creep and stress relaxation are similar and it is theoretically possible to derive the value of one property when the other is known, no explicit demonstrated relationship exists between the two. For a given structural ceramic material, both properties must be experimentally determined to obtain the information necessary for use in high-temperature design and safety analyses. (ERA citation 05:022717)

PB80-199581 PC **A05**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Post Irradiation Examinations of Sphere-Pac Mixed Oxide Fuel Pins Irradiated in a PWR Loop,
A. van der Linde, H. J. B. Lucas Luyckx, and J. H. N. Verheugen. Jun 79, 81p ECN-66

Three fuel pin bundles, R-109/1, 2 and 3, were irradiated in a PWR loop in the HFR at Petten during respectively 131, 57 and 57 effective full power days. The R-109/1 bundle consisted of three pins filled with sphere-pac (U,Pu)O2 with Pu only present in the large, about 1000 micrometer diameter, spheres. One of the three pins was replaced by another after 17 effective full power days. The smear density was 83-84 % T.D. The R-109/2 and 3 bundles each consisted of one UO2 pellet pin, one UO2 sphere-pac pin with the U-235 homogeneously distributed over the three diameter fractions and one (U,Pu)O2 sphere-pac pin with Pu only present in the large spheres. Two pins of R-109/1 and all pins of R-109/2 were originally filled with 1 bar helium. The other two pins of R-109/1 and all pins of R-109/3 were originally filled with 21 bar helium. All pins of R-109/2 and 3 bundles had a fuel column with a smear density of 87-88 % T.D. Irradiation of the pins was performed at an average linear power of about 390 W/cm and at a peak linear power of about 610 W/cm.

PB80-199607 PC **A09**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Effect of Neutron Irradiation on Creep Properties of 18Cr-11 Ni(DIN 1.4948) Stainless Steel Plate and Welded Joints at 823 K,
B. van der Schaaf, M. I. de Vries, and J. D. Elen. May 79, 195p ECN-61

Post irradiation creep data are required on structural steels according to DIN 14948 (equivalent to AISI 304) used in reactor vessel and shield structures for the fast breeder SNR 300. Most important effect of irradiation is diminished ductility of both plate and welded joints. Creep strength of plate is reduced to 50 MPa which means a reduction in creep life by a factor of about 10. Welded joints fracture in unirradiated condition along the dendrite boundaries in the weld at a creep stress 20 MPa lower than parent metal. After irradiation grain boundaries in parent metal adjacent to the weld are weaker causing a further reduction of creep strength of 30 MPa. The average post irradiation stress-to-rupture values of one heat of plate and one type of welded joints fall below the minima of VdTUV and ASME B + PV code.

PB80-200124 PC **A03**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
A Steel Irradiation Capsule in the Petten High Flux Reactor,
T. van der Kaa. Jun 79, 31p ECN-57

A description is given of an in-core capsule for irradiation of stainless steel specimens in stagnant sodium at temperatures between 725 and 925 K. The irradiation time is not limited to one or more full reactor cycles as the capsule can be installed or removed during reactor operation. The design and performance of the capsule are discussed in some detail with emphasis on the in-core part of the capsule. Besides this, attention is given to the data processing and presentation. Purpose of this report is to provide information concerning this irradiation facility for potential users.

PNCT-841-77-60 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Calculation Code MIXSET for Purex Process.
K. Gonda, and S. Fukuda. Sep 77, 204p
In Japanese.
U.S. Sales Only. Microfiche copies only.

MIXSET is a FORTRAN IV calculation code for Purex process that simulate the dynamic behavior of solvent extraction processes in mixer-settlers. Two options permit terminating dynamic phase by time or by achieving steady state. These options also permit continuing calculation successively using new inputs from a arbitrary phase. A third option permits artificial rapid close to steady state and a fourth option permits searching optimum input to satisfy both of specification and recovery rate of product. MIXSET handles maximum chemical system of eight components with or without mutual dependence of the distribution of the components. The chemical system in MIXSET includes chemical reactions and/or decaying reaction. Distribution data can be supplied by third-power polynominal equations or tables, and kinetic data by tables or given constants. The fluctuation of the interfacial level height in settler is converted into the flow rate changes of organic and aqueous stream to follow dynamic behavior of extraction process in detail. MIXSET can be applied to flowsheet study, start up and/or shut down procedure study and real time process management in countercurrent solvent extraction processes. (Atomindex citation 10:427563)

PNCT-841-78-60 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Operation Testing Laboratory in PNC Reprocessing Plant, (1). Transfer Equipments for Chopped Fuel, Dissolver Solution, Degraded Solvent and High Active Waste.
K. Gonda, T. Nemoto, S. Yasu, and S. Miyachi. Nov 78, 29p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The transfer equipment for chopped fuel, dissolver solution, degraded solvent and high active waste were installed in the Operation Testing Laboratory of PNC Reprocessing Plant. This paper describes the transfer mechanism and the transfer method of each equipment. (Atomindex citation 11:503133)

SAND-80-0988C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Release of H and He from TiC, Stainless Steel and Graphite by Pulsed Electron and Furnace Heating.
S. T. Picraux, and W. R. Wampler. 1980, 26p
CONF-800455-1
Contract EY-76-C-04-0789
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

The release of implanted D and exp 3 He from TiC coatings, SS 304 and graphite by pulsed electron beam (e-beam) heating and furnace heating has been investigated. Low fluence implants of D or exp 3 He and saturation fluence D implants have been studied for 0.5 - 1.5 keV D and 3 keV exp 3 He. The retained D or exp 3 He was monitored by ion beam analysis. The 50 ns e-beam pulsing resulted in the release of D in all materials and was compared with release during isochronal annealing in a furnace. A substantial enhancement in the fractional D release was found for D saturated TiC (0.25 D to host atom ratio) compared with low fluence implants. In contrast no enhancement of D release was observed for D saturated graphite and SS 304 compared with low fluence implants. Release of exp 3 He from TiC was also obtained by e-beam pulsed heating and this release was not affected by the presence of saturation concentrations of D. Comparison to furnace anneals and the calculated time evolution of the temperature profiles suggests a simple model for the D release based on diffusion-limited release in the case of pulsed e-beam treatments and trap-limited release in the case of furnace bulk heating. These processes are closely related to hydrogen recycle in tokamaks and have implications for T inventory control and He ash removal. (ERA citation 05:022668)

UCRL-83928 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tritium Management in Fusion Synfuel Designs.
T. R. Galloway. 25 Apr 80, 12p CONF-800427-11
Contract W-7405-ENG-48
Tritium technology in fission, fusion, and isotopic application, Dayton, OH, USA, 29 Apr 1980.

Two blanket types are being studied: a lithium-sodium pool boiler and a lithium-oxide- or lithium-sodium pool boiler and a lithium-oxide- or aluminate-microsphere moving bed. For each, a wide variety of current technology was considered in handling the tritium. Here, we show the pool boiler with the sulfur-iodine thermochemical cycle first developed and now being piloted by the General Atomic Company. The tritium (T sub 2) will be generated in the lithium-sodium mixture where the concentration is approx. 10 ppM and held constant by a scavenging system consisting mainly of permeators. An intermediate sodium loop carries the blanket heat to the thermochemical cycle, and the T sub 2 in this loop is held to 1 ppM by a similar scavenging system. With this design, we have maintained blanket inventory at 1 kg of tritium, kept thermochemical cycle losses to 5 Ci/d and environmental loss to 10 Ci/d, and held total plant risk inventory at 7 kg tritium. (ERA citation 05:023765)

UNI-SA-75 PC **A02**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
Auto-Ignition of Concreted Uranium Scrap, July 23, 1979.
L. P. Forby. 10 Apr 80, 9p CONF-800436-1
Contract EY-76-C-06-1857
DOE fire protection conference, Las Vegas, NV, USA, 22 Apr 1980.

UNC Nuclear Industries is a prime contractor to the Department of Energy and is responsible for the operation of the dual purpose N Reactor at Hanford and fabrication of the uranium fuel used in the reactor. On July 23, 1979, a fire occurred in our storage warehouse involving concreted uranium fines and machine turnings stored in metal cans placed in wooden shipping crates awaiting shipment to National Lead Company of Ohio. The total cost of the fire was $23,000. The fire loss was $1,000 for the wooden shipping boxes and $22,000 for the clean-up of the warehouse from contamination spread and reconcretion of the uranium scrap. A description of the fire is presented. (ERA citation 05:022442)

18K. Reactor Physics

AAEC/E-450 PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Reactor Physics Survey of Water Moderated, Uranium-Aluminium Plate Fuelled Research Reactors for a Range of Uranium Enrichment.
G. S. Robinson. Jul 79, 50p
U.S. Sales Only.

The results obtained from reactor physics calculations of water moderated research reactors with fuel in the form of uranium-aluminium alloy plates are presented. The major parameters considered are uranium enrichment, uranium weight per cent in the fuel meat, exp 235 U loading per plate and the water gap between plates. The calculations are based on the SILOE reactor and particular emphasis is placed on the requirements for a proposed new AAEC research reactor. Sufficient detail is given to enable the determination of core size, fuel consumption rate and neutron flux levels in the core and reflector when this study is combined with a thermal-hydraulic analysis. (Atomindex citation 11:500162)

AAEC/E-465 PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Approximate First Collision Probabilities for Neutrons in Cylindrical and Cluster Lattices.
G. S. Robinson. May 79, 38p
U.S. Sales Only.

Methods for calculating approximate first collision probabilities for neutrons in cylindrical and cluster lattices are presented and compared with numerical solution methods. The methods differ from those of other authors in the inclusion of anisotropic boundary conditions for both geometries. The methods, which are fast enough for routine use in multigroup and resonance subgroup calculations, have been coded in FORTRAN and included in modules of the AUS scheme for reactor neutronics calculations. (Atomindex citation 11:500161)

AEEW-R-1242 PC **A04**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Analytical Treatment for Multi-Layered Reflector Regions in Nuetron Diffusion Codes.
A. N. Buckler. Mar 79, 56p
U.S. Sales Only.

A method is described in which the reflector regions in neutron diffusion codes may be approximately represented by the use of a matrix boundary conditions relating currents and fluxes at the core/reflector interface. The method is incorporated into the EROS computer code on the IBM 370 computer. (Atomindex citation 11:500151)

CONF-791058-69 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Deep Penetration Integral Experiment for a Thorium Blanket Mockup.
D. T. Ingersoll, and F. J. Muckenthaler. 1979, 4p
Contract W-7405-ENG-26
International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22 Oct 1979.

An integral experiment has been performed for verification of radiation transport methods and nuclear data used for design of the radial shield for the gas-cooled fast breeder reactor (GCFR). The experiment included a thorium oxide blanket mockup and several shield configurations. The blanket measurements were needed to reduce uncertainties in the cross-section data used for calculating neutron transmission through a thorium blanket and to bound the uncertainties in calculated gamma-ray heating rates within the blanket. Measured neutron spectra and integral flux data are compared to 1D calculations of the transmitted flux. Calculations using ENDF/B-IV and ENDF/B-V data for thorium are compared and show the version V data to be superior above 1 MeV. The experiment, which is primarily sensitive to the total removal cross section, also showed V to be an improvement below 1 MeV, but still discrepant from the measurements. (ERA citation 05:022394)

CONF-791103-105 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Effectiveness of Three Rebalance Methods in Deep Penetration Problems.
W. A. Rhoades, and E. T. Tomlinson. 1979, 22p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The space-rebalance method brought important new capability to discrete-ordintes calculations by using an easily-solved procedure. Later, diffusion synthetic acceleration used the diffusion equation as the auxiliary equation. Application of this new approach has been slow, partially due to concomitant restrictions. Aull et al showed a reformulation which brought compatibility with weighted-difference and negative-fixup schemes. Miller showed that the differential forms of the conventionl space rebalance (CRB) pand the newer methods could be derived from a common framework. This paper will, similarly, cast the difference form of Aull's consistent diffusion acceleration (CDA) into the same form as CRB and will indicate a third approach suggested by this comparison. Variations of these methods will be tested on deep-penetration problems. (ERA citation 05:022395)

Juel-1599 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Diffusion Theory Simulation Method for the Treatment of the Upper Cavity in Pebble-Bed HTR.
H. Gerwin, and W. Scherer. Jul 79, 93p
In German.
U.S. Sales Only.

A method simple in application is derived, which makes it possible to treat the cylindrical upper cavity in the pebble-bed HTR with diffusion theory. The method which works with every diffusion code, even if absorber rods are present is compared for different arrangements with transport-SN-reference solutions. The cavity is treated as diffusion area with vanishing cross sections; nonzero values as they are derived in the following are assigned to the diffusion constants only. For absorber rods effective cross sections have to be determined with 1-D cell calculations. Very good agreements with the reference can be reached, if anisotropic diffusion constants are foreseen in the diffusion code. But even with isotropic diffusion constants better eigen-values and rod-efficiencies are achieved, than with the method used in the code DIFF-H, in which the coupling between surface elements of the cavity is described by a 'response-matrix' determined transport-theoretically. Additionally there exists the advantage that also 3-D calculations are possible and considerably shorter computing times can be reached. (Atomindex citation 11:500154)

JAERI-M-7887 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
FCA Assembly V-2 Critical Experiment.
T. Iijima, T. Mukaiyama, N. Mizoo, K. Shirakata, and H. Maekawa. Oct 78, 48p
In Japanese.
U.S. Sales Only.

The results are described of critical experiments of the FCA assembly V-2, which is the second physics mock-up core for experimental fast reactor JOYO. Its first criticality was attained on October 23rd, 1970. Core composition of the assembly is the same as the following V-3 assembly. The main purpose is engineering mock-up experiments for JOYO control rods. The critical masses for the homogeneous cylindrical core were 91.40 +- 0.28 kg of exp 239 Pu + exp 241 Pu and 125.05 +- 0.38 kg of exp 235 U. The calculated effective multiplication factor with S sub(n) correction differs from measured values with JAERI-Fast original, ditto version-II, RCBN and ABBN set by -0.18, +1.26, -0.28 and +2.92% delta k respectively. (Atomindex citation 11:502875)

JAERI-M-8097 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Point Reactivity Burnup Code DELIGHT-4 for High Temperature, Gas-Cooled Reactor Cells.
R. Shindo, M. Hirano, and K. Minami. Feb 79, 104p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The code DELIGHT-4 has been developed for analizing burnup characteristics of the graphite moderated reactor cells and producing the few-group constants. Calculation models for the code are presented. (Atomindex citation 11:503178)

JAERI-M-8117 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Experimental Study of LMFBR Heterogeneous Core at FCA.
M. Nakano, S. Iijima, K Shirakata, and J. Hirota. Mar 79, 18p
U.S. Sales Only.

In order to investigate physics properties of the heterogeneous LMFBR core and to examine reliability of the current data and method for heterogeneous core configuration, an experimental study has been made on FCA VII-3 Assembly which has an internal blanket (IB) at midplane of the cylindrical core. Systematic measurements of the criticality, sample worth, fission rate ratio, reaction rate distribution and sodium void worth were made on the heterogeneous cores whose IBs were different in composition and thickness. The sodium void worth for the region from the midplane to the middle of the core decreases with increase of exp 238 U or Pu atomic density in the IB. The worth is, however, not sensitive to composition of the IB. The void worth in the core is lowered by about 35% when the thickness of the IB is increased from 20 cm to 40 cm. The initial analysis using the JAERI-Fast Set Version II and the diffusion code CITATION was made for Assembly VII-3-1, the core with IB of 30 cm thickness. Comparison between the calculated and experimental results revealed the following: Pu worth is not well predicted in the core. Reaction rates sensitive to low energy neutrons are underestimated in the IB when they are normalized in the core. A discontinuity of more than 20% in the C/E value of the sodium void worth exists at the interface of the IB and the core. (Atomindex citation 11:502877)

JAERI-M-8118 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Measurement of Multiple Rod Worth by Sample Worth Method.
M. Nakano, and N. Mizoo. Mar 79, 24p

In Japanese.
U.S. Sales Only.

Applicability of the sample worth method has been investigated in the rod worth experiment made with FCA Assembly VII-1/90Z-7, mock-up of the prototype fast reactor. A B sub 4 C pin cluster of B73-16P (73% enriched B sub 4 C, exp 10 B asymptotically equals 1.8 kg) was mainly used for the simulating rod. The correction factor for the rod interaction was measured using three kinds of samples, i.e. B90-1P (90% enriched B sub 4 C, exp 10 B asymptotically equals 0.14 kg), BN-16P (natural B sub 4 C, exp 10 B asymptotically equals 0.5 kg) and B73-16P. The reactivity worth of B90-1P sample is about 1/7 that of B73-16P. Agreement was good between the correction factors obtained with each sample, the experimental error being about 0.5 to 1%. The error tends to increase with decreasing reactivity worth of the sample used. The reactivity worth of the multiple rod worth estimated by using the correction factors and the single rod worths agreed very well with that obtained by direct measurement. The sample worth method is useful for estimating the reactivity worth of a multiple control rod. A sample having more than half the reactivity worth of the control rod is advisable for the experiment. (Atomindex citation 11:502878)

JAERI-M-8138 PC **A09**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study of Analytical Method for Sodium Void Reactivity in Fast Critical Assemblies.
M. Nakagawa. Jan 79, 197p
U.S. Sales Only.

Calculational methods have been developed to analyze neutronics parameters of fast critical assemblies with heterogeneous arrangements of cells. These methods have been applied to analysis of sodium void experiments. The analysis was first made using the broad group constant set. The integral transport equations are solved for a unit cell by the collision probability method. On the other hand, the fine group spectrum and multigroup cross section calculation code ESELEM 5 has been developed to examine adequacy of the broad group constant method and also to make detailed analysis. To solve the integral transport equations in a fine group structure, effective methods have been contrived and incorporated in the code. Sodium void reactivity worths were calculated on the basis of the first order and the exact perturbation theory. Calculations of the sodium void reactivity worths and the related neutronics parameters were made for FCAV-1, MZA, MZB, ZPPR-2 and ZPPR-3 assemblies, using the JAERI Fast sets. The JAERI Fast version 2 set is found to give better agreement with the measurements than the other versions, especially for the core center. Calculations show that the heterogeneity effect and the neutron streaming effect significantly influence the sodium void worths in plate environment. The deviations of the worth from measurement are nearly same in the respective assemblies. The fine group method was shown to give 10% - 20% more positive worths than the broad group method. The discrepancies between the fine group and the broad group methods could be made clear. The self-shielding factors of elastic removal cross sections of light and medium nuclei in the broad group set have been investigated and improved in accuracy within the concept of the conventional set. The set thus revised predicts the neutronics parameters with higher accuracy than the conventional set. (Atomindex citation 11:502876)

LA-UR-78-427 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Reactivity Coefficients of Heavy Isotopes in LASL'S Fast Critical Assemblies.
C. C. Byers, G. E. Hansen, J. J. Koelling, E. A. Plassmann, and D. R. Smith. 1978, 3p CONF-780622-84
Contract W-7405-ENG-36
ANS annual meeting, San Diego, CA, USA, 18 Jun 1978.

A systematic investigation of heavy isotope behavior in the Pajarito fast-neutron critical assemblies is described. Included will be central reactivity coefficient measurements and fission rate measurements in natural uranium reflected plutonium and 93%-enriched uranium metal assemblies and in Big Ten, a depleted uranium reflected 10%-enriched uranium metal assembly. (ERA citation 05:022439)

ORNL/TM-7181 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
COVERX Service Module of the FORSS System.
J. D. Drischler. Apr 80, 42p ENDF-291
Contract W-7405-ENG-26

The COVERX Service Module includes seven execution paths to aid in understanding and using multigroup cross-section covariance matrices contained in the standard interface file COVERX. The execution paths provide the following operations on COVERX file(s): list the contents of a COVERX file; allow adding new multigroup cross-section covariance matrices to an existing COVERX file; allow deletion of multigroup covariance matrices from an existing COVERX file; merge two COVERX files and creates a new file; change the mode of a file from unformatted to formatted and conversely; allow modification of the records contained in a COVERX file; and selectively edits or copies a file. (ERA citation 05:022404)

18M. Reactors (Non-Power)

AD-A085 817/5 PC **A99**/MF **A01**
General Electric Co Santa Barbara CA Tempo
TREE Simulation Facilities, Second Edition.
Judy V. Rosenfeld. 1 Jan 79, 607p DNA-2432H-2, AD-E300 788
Contract DNA001-79-C-0081
See also AD-A009 308. Includes errata sheet data 6 Feb 80.

It is the purpose of this document to provide persons working in this area of transient radiation effects on electronics (TREE) with a reference document which characterizes on a technical basis TREE Simulation Facilities. Pulse reactors, flash X-rays, and LINACs are each characterized on an individual basis. The material is arranged to provide the TREE experimenter with the facility information he would need to know in order to run an experiment at one of the facilities.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A085 826/6 PC **A05**/MF **A01**
MB Associates San Ramon CA
XM746 Practice Fuze.
Progress rept. no. 2, 1 Mar-28 Sep 79. 1979, 77p
Contract DAAK10-79-C-0040

The primary object of the test was to determine function time, smoke cloud size and duration of Ordnance Research Inc. (ORI) type B & type C charges, ARRADCOM MOD E and MOD E1 chargers and the MBA improved TiCl4/ARRADCOM MOD E charge. Based on the test results, the best performing ORI and ARRADCOM configuration was to be carried forward for ballistic range testing at Ft. Lewis. In the case of the MBA design, it would be carried forward only if the function time was fast enough to indicate a reasonable probability of success. The function time was adequate to justify continued development.

AD-A085 832/4 PC **A05**/MF **A01**
MB Associates San Ramon CA
XM746 Practice Fuze.
Progress rept. no. 4, 1 Feb-28 Mar 80. 28 Mar 80, 86p
Contract DAAK10-79-C-0040
Includes Rept. no. MB-TM-79/02.

This program is for the design and development of the XM746 Practice Fuze Spotting Charge.

AD-A085 964/5 PC **A02**/MF **A01**
Naval Weapons Center China Lake CA
High Pressure Pressing Technique for Solvated Cyclotrimethylenetrinitramine (RDX) and Cyclotetramethylenetetranitramine (HMX) Pellets.
Research rept. Jan 78-Jul 79,
Rena Y. Yee, Arnold Adicoff, and Duane M. Pearl. May 80, 10p Rept no. NWC-TP-6180

A technique for preparing high density, mechanically strong explosive pellets without any binder is described. It involves pressing under high pressure (51.6 MPa) and the use of acetone as a solvating liquid. For cyclotrimethylenetrinitramine (RDX), the pellet density obtained is 98% of the theoretical density of the pure crystals. Pellets of cyclotetramethylenetetranitramine (HMX) can also be prepared the same way. The residual acetone in the pellet is negligible for most applications. The procedure is a batch operation with pressing time 2-10 minutes. (Author)

AD-A085 973/6 MF **A01**
Honeywell Inc Hopkins MN Defense Systems Div
Manufacturing Methods and Technology Program for the 10-kHz Tape-Automated Bonded Hybrid Microcircuit Oscillator.
Final rept.,
Bernard E. Goblish. Dec 79, 216p 2730-41637, HDL-CR-79-010-1
Contract DAAG39-78-C-0010
Availability: Microfiche copies only.

A Manufacturing Methods and Technology (MM&T) program was conducted on a 10-kHz hybrid microcircuit oscillator for use in electronic time fuzes. The oscillator which was originally developed under contract DAAG39-77-C-0056, uses tape-automated bonding (TAB) techniques to eliminate the use of individually bonded wires. The processes and achievable production rates were investigated and a total of approximately 2000 circuits were built. Recommendations are made for the equipment to be used for volume production of the oscillator. (Author)

AD-A086 090/8 PC **A03**/MF **A01**
Radford Army Ammunition Plant VA
Explosive Hazards Tests for Establishing Hazards Classifications for M1 Propellant for Automated Single-Base Finishing Operations. Part II.
Final rept. Feb 78-Sep 79,
J. L. Evans, and W. O. Seals. Jun 80, 38p ARLCD-CR-80011, AD-E400 425
See also report dated Jan 78, AD-A060 808. Also available as Rept. no. GIDEP-E123-2004.

Subscale vented vessels of two sizes were tested at various levels of vent ratio to determine the effects of vent area and scale (vessel size) on pressurization rates for cannon propellants. Two cannon propellants, M26 and M30, were used in the experimental work. Test results were used to predict the performance of a full-scale vessel - Continuous Automated Multi-Base Line (CAMBL) dryer. Analyses of the results show that the CAMBL dryer containing 680 kg of M26 or M30 propellant would produce a burning-only reaction if these propellants were ignited. The CAMBL dryer should, therefore, be classed a 1.3 burning only hazard. The results of the test were subjected to math modeling efforts. The modeling efforts demonstrated that the variables--vent ratio, scale, and pressure exponent--can be used to predict vented vessel performance. General recommendations for performing similar studies, at some future date, were made.

AD-A086 091/6 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Aerodynamic Performance of Projectiles with Axisymmetric and Non-Axisymmetric Boattails.
Final rept.,
Lyle D. Kayser, and Walter B. Sturek. May 80, 61p ARBRL-MR-03022, AD-E430 462

Aerodynamic properties of projectile shapes with axisymmetric and nonaxisymmetric boattail shapes are presented. The nonaxisymmetric boattail is formed by a number of flat surfaces. Three flat surfaces equally spaced would develop into a triangle at the base; all non-conical data in this report are for the three-surface, or triangular, boattail. Surface pressure measurements were obtained on the non-conical boattail and a comparison of these measurements to three dimensional flow field computations for the same shape are re-

ported. Inviscid computations on several axisymmetric shapes are compared to experimental data obtained on non-axisymmetric boattail shapes so that an evaluation of the non-axisymmetric boattail performance could be made. The non-axisymmetric shapes can have significant stability advantages over axisymmetric shapes and still retain the advantage of drag reduction by boattailing.

AD-A086 092/4 PC **A02/MF A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Triaminoguanidinium Ion in Triaminoguanidinium Nitrate by the MINDO/3 Semi-Empirical SCF-MO Treatment.
Final rept.,
Arthur J. Bracuti, and Yvon P. Carignan. Jun 80, 17p ARLCD-TR-80002, AD-E400 435

MINDO/3 semi-empirical SCF-MO calculations on the triaminoguanidinium ion of triaminoguanidinium nitrate have provided information on the total energy, core-core repulsion energy, electronic energy, charge distribution, heat of formation, ionization potential, and dipole moment of the cation. The effect of rotation across the N-N bonds on the values of these parameters is presented. The configuration of the cation with the lowest total energy corresponds to the configuration determined by x-ray analysis on a crystal of triaminoguanidinium nitrate and the energy barrier for the rotation of the three primary amino groups is of the order of 1.38 eV (31.8 Kcal).

AD-A086 093/2 PC **A04/MF A01**
Army Armament Research and Development Command Dover NJ Fire Control and Small Caliber Weapon Systems Lab
Thermochemical and Burning Rate Properties of Deterred U.S. Small Arms Propellants.
Final rept.,
Ludwig Stiefel. Jun 80, 56p ARSCD-TR-80005, AD-E400 430

The depth of penetration was determined in eight U.S. military small arms propellants. The measurements were made on microtomed sections of the propellants. Staining techniques were used with some of the propellants to obtain good delineation of the deterrent-layer boundary. The propellants involved were double-base ball propellants WC 846 and WC 870, and single-base extruded IMR 4227, IMR 4350, IMR 5010, IMR 8138M, and CMR 160. From the results of the depth of penetration measurements, the compositions of the inner, undeterred, region and the composition of the outer, deterrent-containing, region were calculated. The Hirshfelder-Sherman method and the BLAKE code were used to compute the thermochemical properties of the overall compositions, and the compositions of the deterred and undeterred regions. The results from the two approaches are compared. The burning rate parameters were finally calculated for the different layers in the WC 870 and CMR 160 propellants on the basis of four different correlations of burning rate with adiabatic flame temperature. The results provide a selection of empirical equations to calculate burning rate constants, for the deterrent-containing and undeterred layers useful for interior ballistic calculations.

AD-A086 095/7 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Algorithm for Estimating Aerodynamic Static Moments of Long Rod Penetrators at 2 Less than M Less than 5.
Memorandum rept.,
William F. Donovan. May 80, 49p ARBRL-MR-03020, AD-E430 468

Estimation of the aerodynamic normal force and static moment of a given class of flight vehicles is demonstrated with reference to AMCP 706-280, which in turn derives from the classic British work 'Wings'. By means of linearized algebraic reduction, a transmutation permits the designer to quickly evaluate the effects of variation on the flight system.

AD-A086 096/5 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Aerodynamic Characteristics of the 30mm, XM788 Projectile.
Final rept.,
Robert L. McCoy. May 80, 48p ARBRL-MR-03019, AD-E430 465
Supersedes Rept. no. ARBRL-IMR-637, dated Mar 79.

Spark range tests of the 30mm, XM788 projectile were conducted to determine the small-yaw aerodynamic properties at supersonic, transonic, and subsonic speeds. The XM788 projectile, fired from the XM230E1 barrel is adequately gyroscopically stable at all speeds tested. The data show that a slow-arm (precession) limit-cycle yaw exists at low transonic and subsonic speeds. The drag increase due to the limit-cycle yaw is discussed.

AD-A086 105/4 PC **A05/MF A01**
IIT Research Inst Chicago IL
Sensitivity to Secondary Fragment Impact of Shell Filled with Molten Cyclotol 75/25, TNT, and Composition B.
Final rept.,
Edmund J. Swider, Michael F. Leondi, and Richard M. Rindner. Jun 80, 96p ARLCD-CR-80005, AD-E400 428
Contract DAAK10-77-C-0115

The first phase of a two-phase experimental program was conducted to establish the impact sensitivity of 4.2-inch and 81-mm projectiles to secondary fragments. The target shells used in the experiment represented 'just filled' projectiles with HE fillers of Cyclotol 75/25, TNT, and Composition B in the molten condition. The threshold impact velocities of the concrete fragments which initiated the shells were determined. In addition, an empirical model was developed which significantly reduces the number of tests required to determine the impact sensitivity of any given ammunition item. In the second phase, simulated torpedo warheads filled with PBXN-103, H-6, HBX-1, and HBX-3 at ambient temperature were impacted with brick wall fragments representing potential storage hazards. Both the impact characteristics which caused threshold initiation and those which resulted in acceptor insensitivity were determined.

AD-A086 106/2 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Windowed Chamber Investigation of the Burning Rate of Liquid Monopropellants for Guns.
Final rept.,
William F. McBratney. Apr 80, 48p ARBRL-MR-03018, AD-E430 463

Equipment and techniques have been developed for the photographic observation of burning liquid monopropellants at pressures up to 200 MPA. Many details of the liquid surface and the reaction zone above it may be observed. Preliminary photographic runs have been made on OTTO Fuel II, NOS-365, and NOSET 'A'.

AD-A086 112/0 PC **A05/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Inertial Despin Moment Measurements of a Canted Loose Ring during Spin and Nutation.
Final rept.,
Clarence C. Bush. Apr 80, 88p ARBRL-MR-03013, AD-E430 464

Experiments were made on a loose ring model in a spin fixture to check the validity of the theory that predicts the effect of a loose internal component on the flight behavior of spinning and nutating projectiles. The inertial despin moment of the loose ring was obtained by recording the spin rate versus time. During the test, the complete model was allowed to decelerate freely in spin while it was held at discrete coning angles between zero and 600 RPM. The anticipated spin rate at the start of each spin-down was 6,500 RPM; however, sufficient spin power was not always available. Four loose rings were tested. The important polar angle relationship between the cant plane of the loose ring and the yaw plane of the projectile during spin-downs could not be measured. This experimental inadequacy resulted in an insufficient validation of the theory. Initially, in the absence of the cant-plane phase angle measurement, the correlation between theory and experiment was made by assuming a phase angle of 45 degrees. This correlation, made at a spin rate of 3,000 RPM, indicated a general support of the theory by the experiments. The test results, in conjunction with the spin theory, were also used for computation of the loose ring phase angles that existed during the spin-downs. These results indicate an average phase lag angle of approximately 30 degrees, although large variations were observed with spin rate during the spin downs. Averaged phase angles from three flight tests were 34.0, 29.0, and 24.4 degrees.

AD-A086 119/5 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Demonstration of a Technique for the Measurement of Surface Pressures on Spinning Wind Tunnel Models via Telemetry.
Final rept.,
William P. D'Amico, Jr. Apr 80, 33p ARBRL-MR-03017, AD-E430 445

The measurement of surface pressures on rotating bodies such as wind tunnel models or spin-stabilized projectiles is possible through the use of a telemetry link. Via telemetry, the rotating and/or translating frame can be coupled to the laboratory or stationary frame, but great care must be exercised to properly account for differences in phase within the various data channels. A novel and unique pressure measurement was accomplished by Mark for a spinning wind tunnel model, but the circumferential pressure distributions contained an anomalous phase error. This error has been identified and corrected. A phase delay was produced by a low pass filter used in the discrimination of the output of the telemetry receiver. Since the receiver output had been recorded in an analog form, some of the original data were re-reduced with corrections for a constant phase delay. With the phase anomaly explained, the original technique of Mark presents a very attractive scheme for the acquisition of surface pressure data from spinning models.

AD-A086 142/7 MF **A01**
Environmental Research Inst of Michigan Ann Arbor
Test Array Number 1 for Mine Detection Experiments.
Technical rept.,
Reed Maes. Jan 80, 89p Rept no. ERIM-138300-38-T
Contract DAAK70-78-C-0198
Availability: Microfiche copies only.

To provide for the conduct of remote mine detection tests, a test array was established on a twenty-acre site in Washtenaw County, MI approximately one mile west of Ann Arbor Airport. The topography, soil, and vegetation of the site is representative of the North German Plain. The total area, roughly 200 m by 400 m, was divided into 16 rectangular areas or elements, each 50 m by 100 m in size. Each of the elements was used for installation of dummy mines, either surface or buried, in specific configurations, for the location of various ancillary military items, as an undisturbed control area, or for the location of special instrumentation or calibration units. Configurations of each element are documented, and data are presented on test site vegetation, soil conditions, and soil moisture content, also on meteorological conditions during periods when overflights were made for mine detection tests of various sensors. (Author)

AD-A086 220/1 PC **A05/MF A01**
Avco Systems Div Wilmington MA
Evaluation of High L/D Earth Penetrators.
Final rept. 7 Apr 78-30 Aug 78,
D. Henderson. 30 Nov 78, 82p AVSD-0127-79-RR, DNA-4984F, AD-E300 811
Contracts DNA001-78-C-0176, DNA001-77-C-0098

This report develops an approach for performing parametric studies of high L/D earth penetrators by using the primary response frequencies and modes. The applicability has been demonstrated by performing correlation studies of test data, detailed response analysis, and the simplified ap-

proach. The parameters that may be varied are impact velocity, angle-of-attack, target material, and penetrator strength. The preliminary results are that increased penetrator capability, at a given angle-of-attack, may be obtained at higher impact velocities because of the resonance phenomena. (Author)

AD-A086 259/9 PC **A11**/MF **A01**
Joint Technical Coordinating Group for Air Launched Non-Nuclear Ordnance
Joint Services Evaluation Plan for Preferred and Alternate Explosive Fills for Principal Munitions. Joint Services Explosive Fill Program (Long Range) Final Report on the Use of Emergency Funds. Volume IV. Joint Service Safety and Performance Manual for Qualification of Explosives for Military Use.
Final rept.,
I. Kabik, R. Stresau, R. Hamilton, J. Jones, and H. J. Gryting. 19 Sep 72, 239p
See also Rept. no. ARLCD-SP-77004-VOL-1 dated Sep 77, AD-A044 783.

This document presents a compilation of Joint Service test procedures for qualifying primary, booster and main charge explosives for interim development and final application in military end-items. These qualification procedures will be required for any explosive under consideration by any of the military services. (Author)

MLM-2711(OP) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
X-Ray Induced Auger Electron Spectroscopic Studies on Aluminum Metal Surface Films in Aluminum/Iron Oxide Thermites.
P. S. Wang, L. D. Haws, and J. A. Peters. 1980, 16p CONF-800713-9
Contract AC04-76DP00053
International pyrotechnics seminar, Vail, CO, USA, 14 Jul 1980.

The aluminum and iron oxide surfaces of Al/Fe sub 3 O sub 4 thermite in powder and pressed pellet form were studied before and after accelerated aging at 180 exp 0 C by x-ray photoelectron spectroscopy (XPS). The Al sub 2 O sub 3 surface film thicknesses on Al metal were deduced from the intensity ratio of Al K-LL Auger signals induced by x-ray radiation on Al sub 2 O sub 3 and Al metal. Based on the mean free path of 16.5 A for Al KLL Auger electrons, the oxide thickness on aluminum flakes before mixing with Fe sub 3 OFe sub 3 O sub 4 was estimated to be 8-9 A. A slight oxidation was observed on the aluminum surface after mixing with Fe sub 3 O sub 4 at room temperature. Hot pressing of this mixture at 425 exp 0 C for 7 minutes increased the oxide film to 31 A. This surface oxide film seemed to protect the Al metal and further aging at 180 exp 0 C did not cause significant oxide growth. A layer of carboxylate was detected on the aluminum surface from the C ls XPS signal. The presence of an Fe 2p/sub 3/2/ signal indicated the presence of Fe exp +2 and Fe exp +3 . A weak hydroxyl signal was also observed; this was attributed to slight moisture contamination of the Fe sub 3 O sub 4 surface. (ERA citation 05:024437)

PAT-APPL-6-155 719 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fuseless Explosive Propellant Cartridge.
Patent Application,
Daniel G. True, and Robert J. Taylor. Filed 2 Jun 80, 11p AD-D007 307/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses an explosive propellant cartridge for use in propellant-actuated devices. The cartridge contains only the explosive propellant which is stable and safe when not confined in a vessel capable to high pressure containment and does not contain the less stable fusing element. The propellant is contained in an annular space between concentric tubes with the inner tube being perforated. An elongated fusing element is inserted into the inner tube after the cartridge is secured in the propellant-actuated device. (Author)

PAT-APPL-6-157 723 PC **A02**/MF **A01**
Department of the Navy Washington DC
Electromagnetic Arming Rate Regulator.
Patent Application,
Edward H. Takken. Filed 9 Jun 80, 14p AD-D007 303/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device for adjustably changing the arming time of a projectile having an arming mechanism for arming the projectile at a predetermined rate is presented. A pallet made of magnetically susceptible material and supported for repetitive movement is disposed within a generated magnetic field. The pallet is connected to the arming mechanism for corresponding movement therewith and is driven by the arming mechanism while arming. The magnetic field induces magnetic losses within the pallet which retards the arming rate. (Author)

PATENT-4 178 855 Not available NTIS
Department of the Navy Washington DC
Explosive Actuated Arming Switch Device.
Patent,
James V. McVay, and Patrick A. Yates. Filed 20 Mar 78, patented 18 Dec 79, 7p AD-D007 330/4, PAT-APPL-890 561
Supersedes PAT-APPL-890 561-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a conductor plated on a frangible substrate. The unit is potted in a silicon base compound, placed in a header, and attached to a printed circuit board. This assembly is then encased in a housing using epoxy resin potting compound. The circuit is protected from breakage due to mechanical shock by the epoxy resin but is immediately broken by an explosive shock wave which fractures the substrate and the conductor and opens the circuit. (Author)

PATENT-4 204 475 Not available NTIS
Department of the Navy Washington DC
Arming-Safing System for Airborne Weapons.
Patent,
Ronald J. Fowler. Filed 29 Apr 69, patented 27 May 80, 5p AD-D007 355/1, PAT-APPL-823 243
Supersedes PAT-APPL-823 243-69.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The system of the present invention basically consists of a detector unit mounted in each bomb or airborne weapon and operable upon interception of a signal emitted by an aircraft-mounted source. The required signal for arming is present only in a well defined zone below the aircraft and only in response to pilot command during weapon release. The signal consists of mechanically modulated beam of high-energy photons (gamma rays) emitted by a radioisotope source on the aircraft. The weapon must fall well below the aircraft to see the signal. Geiger-Mueller tubes are used for radiation detectors and the resulting signal is processed to initiate the arming or fuzing sequence. Power for the operation of the detector and associated electronics is transferred through the metallic covering of the weapon by means of a split-core transformer at the time of release. The power transferred is capable of operating the unit for the length of time it would normally take the weapon to fall through the signal zone; after which the weapon returns to a dormant, safe, state if no arming signal has been received. (Author)

PB80-196801 PC **A10**/MF **A01**
Department of the Interior, Washington, DC.
Explosion and Explosives.
c1980, 221p TT-78-52023
Trans. of Kagyo Kayaku Kyokaishi (Japan) v33 n1 p9-16 1972. See also volume 32, number 6, TT71-53153-06. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Contents:
- Breakage of brittle material by quasi-static pressure of explosion gas;
- Studies on the flyer plate by the detonation of explosives;
- Detonation tests with ammonium nitrate, its mixture, and nitrates of organic bases;
- Recent topics in nitration mechanism;
- Explosion behavior of detonator inserted into cartridge by flash radiography;
- Effects of water pressure on crater produced by the underwater crater test;
- Study of stress wave propagation through boundary between concrete block and water;
- Effects of aluminum particles on burning of composite propellants;
- On burning preventing agents for coalmine explosives--II. Inorganic compounds;
- Research on combustion of ammonium nitrate explosives;
- Shock sensitivity of explosive materials--I. Fundamental experiments on gap test;
- Decomposition reaction of nitrate esters;
- Electric blasting cap with base charge of DDNP;
- Some experiments on the shock wave pressure generated by underwater explosions.

SAND-80-0355C PC **A02**/MF **A01**
IIT Research Inst., Chicago, IL.
Design and Evaluation of Progressively Burning Pyrotechnic Formulations.
J. L. Austing, and P. W. Cooper. 1980, 24p CONF-800713-1
Contract EY-76-C-04-0789
International pyrotechnics seminar, Vail, CO, USA, 14 Jul 1980.

The design and evaluation of a pyrotechnic that burns for 2 ms and generates gas cubically with time is described. The charge is a mixture of two aluminum-plated pyrotechnics, viz., aluminum-potassium perchlorate (Al-KCl0 sub 4) and aluminum-vanadium pentoxide (Al-V sub 2 O sub 5). The Al-KCl0 sub 4 is a gas generator, each gram of which produces 320 cc of gas (STP); the Al-V sub 2 O sub 5 , on the other hand, is a gasless pyrotechnic. Progressive generation of gas is achieved by utilizing mixtures of two pyrotechncs in increments that are progressively richer in gas generant, over a range of 14.6% to 100% Al-KCl0 sub 4 by weight. The deflagration rate of the system is a function of the Al-KCl0 sub 4 content, and ranges from 16.2 in./msec for a mixture with 14.6% Al-KCl0 sub 4 by weight to 30.0 in./msec for pure Al-KCl0 sub 4 . An evaluation of the pyrotechnic charge fired in air showed that the design goals were adequately achieved. The growth of the gas cloud was monitored by high speed Fastax photography. Two criteria were utilized to verify the performance: (a) a plot of gas cloud volume as a function of time on logarithmic coordinates approached and maintained the required slope of 3, and (b) a plot of cloud diameter versus time on these coordinates achieved a slope of 1. In addition, the gas specific volume maintained a consistent value of about 27,000 cc/g of reacted Al-KCl0 sub 4 throughout the 2.0-ms burning time. (ERA citation 05:024583)

19C. Combat Vehicles

AD-A086 144/3 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Towing Resistance.
Final rept. on test operations procedure.
25 Jun 80, 6p Rept no. TOP-2-2-605
Supersedes Rept. no. TOP-2-2-605 dated 13 Nov 74, AD-A017 075.

Describes procedures for determining vehicle power losses attributable to the suspension system and vehicle braking effect available for descending grades. Discusses vehicle preparation, instrumentation, data reduction, and data presentation. Applicable to wheeled and tracked vehicles. (Author)

19D. Explosions, Ballistics, and Armor

AD-A085 930/6 PC **A04**/MF **A01**
AeroDyne Research Inc Bedford MA
Optical and Fluid Dynamic Properties of Explosion - Produced Dust Clouds.
Final technical rept. Jun-Sep 79,

John F. Ebersole, Roberto Vaglio-Laurin, and David S. Dvore. May 80, 68p ARI-RR-181.1, ERADCOM/ASL-CR-80-0043-2
Contract DAAK20-79-Q-0043

A model (DIRTRAN) descriptive of time/space dependent optical properties of explosion-generated dust clouds has been developed. This model includes three components: a dust source term, atmospheric diffusion, and optical transmission. Data analysis indicates that for a given soil, the greatest uncertainties lie in the determination of soil comminution/agglomeration under the dynamic loading produced by explosions. When an empirical parameter descriptive of this effect is employed, the model predicts cloud optical properties which compare favorably with experiments under a variety of explosion patterns, charge types, and atmospheric conditions. A computer code (DIRTRAN-I) which embodies this model has been delivered to the Army Atmospheric Sciences Laboratory for inclusion in the Electro-Optics Systems Atmospheric Effects Library. (Author)

AD-A086 111/2 PC **A03**/MF **A01**
Rockwell International Columbus OH Autonetics Missile Systems Div
Numerical Estimation of Stress Intensity Factors by a Finite Difference Eulerian Method (the HELP Code).
Final rept.,
M. S. Chawla, and J. A. Zukas. Apr 80, 38p ARBRL-CR-00426, AD-E430 460
Contract DAAD05-77-C-0139

A finite difference Eulerian code, HELP, is employed to study the stress enhancement effects in the vicinity of a crack tip in a rectangular plate which is subjected to a sudden uniaxial loading in the plane strain geometry. The results are in excellent agreement with those obtained from other methods. This demonstrates the usefulness and accuracy of the HELP code in simulating dynamic problems of fracture mechanics.

AD-A086 219/3 PC **A07**/MF **A01**
Systems Science and Software La Jolla CA
Feasibility Investigation of a Permanent Fuel-Air Explosive Blast Simulator.
Topical rept. 9 May 77-9 Aug 78,
R. T. Sedgwick, H. B. Kratz, and R. G. Herrmann. 9 Aug 78, 146p SSS-R-78-3737, DNA-5059T, AD-E300 812
Contract DNA001-77-C-0251

Initial results from an investigation to determine the feasibility of using fuel-air-explosives (FAE) to simulate the airblast from a 1 KT nuclear blast are reported. A small scale blast facility was developed and tested. Up to 22.7 kg (50 lbs) of fuel such as propylene oxide can be disseminated through a hemispherical nozzle head containing 600 nozzles to form 9.14 m (30 ft) diameter hemispherical clouds which are subsequently detonated. The measured pressure history and impulse from several experiments were scaled and compared with 1 KT nuclear blast wave data. These initial results indicate that FAE can be used to simulate nuclear blast waves and that continued effort to develop the technology required to design a permanent, reuseable 1 KT FAE nuclear blast wave facility is therefore warranted. (Author)

19E. Fire Control and Bombing Systems

AD-A085 868/8 PC **A04**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Howitzer Fire Mission Workbook.
Research product,
Stephen L. Goldberg. Apr 80, 71p Rept no. ARI-RP-80-8

The workbook is a pocket-sized, performance-oriented training aid designed for field use. It contains four practice sessions that each take about one hour to complete. Each session consists of a number of dry-fire direct and indirect fire missions and two evaluation missions. The evaluation missions allow sections to keep track of their performance. The workbook can provide drill to gunners and assistant gunners and cross training for other howitzer section members. The training Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) has pursued a program of research directed at developing data and technology to enhance and sustain the competence, motivation and performance of individuals and units. This research product was developed within a project designed to investigate contributions of individual proficiency and personnel turbulence to overall crew performance. The final objective of the research is to determine effective personnel assignment and training procedures for units in turbulent personnel environments.

AD-A085 980/1 PC **A05**/MF **A01**
Auburn Univ AL Engineering Experiment Station
Quantization Effects on Target Handoff from TV to IR Digitized Scenes.
Final technical rept. 21 Mar-15 Sep 79,
J. S. Boland, III , and H. S. Ranganath. 15 Sep 79, 92p
Contract DAAK40-79-M-0104

This report presents the results and conclusions based on the analysis and simulation performed on day TV and IR digitized scenes. Specifically, the effects of four-bit quantization vs eight-bit quantization and of scale factor errors on correlation accuracy are given. A new more reliable correlation algorithm is also given. (Author)

PAT-APPL-6-157 750 PC **A02**/MF **A01**
Department of the Navy Washington DC
Burst on Target Simulator Device for Training with Rockets.
Patent Application,
Albert H. Marshall. Filed 9 Jun 80, 23p AD-D007 302/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a weapons simulator for training a marksman on an antiarmor weapon. The weapons simulator includes first and second broadcasting means for projecting on a reflective display screen a background scene, a visual target, and an infrared target spot in alignment with the visual target, and a two axis laser spot positioning servo system for moving the aligned visual target and infrared target spot upon the reflective display screen. A matrix detector mounted within the weapon will sense the position of the infrared target spot upon the reflective display screen whenever the marksman fires the weapon, and then supply to a microprocessor computer digital information indicative of the position of the infrared target spot upon the reflective display screen. The microprocessor computer, in turn, processes the digital information so as determine whether the marksman has scored a hit, a miss, or near miss upon the visual target. (Author)

PATENT-4 174 177 Not available NTIS
Department of the Navy Washington DC
False Target Warning System.
Patent,
Keith L. Gardner, and Goro Fujiwara. Filed 14 Aug 78, patented 13 Nov 79, 4p AD-D007 328/8, PAT-APPL-933 300
Supersedes PAT-APPL-933 300-78, AD-D005 322.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for warning a target designator operator whenever a target less than a predetermined distance from the operator is designated. Actuating the target designator triggers a time interval counter and circuitry to detect reflected pulses. An indicator will warn the operator if a pulse is reflected to the system from an object less than a predetermined distance from the operator. (Author)

PATENT-4 187 761 Not available NTIS
Department of the Navy Washington DC
Variable Force Control System for Weapon Ejection Mechanisms.
Patent,
Lloyd J. Holt, and Clayton E. Panlaqui. Filed 19 Sep 78, patented 12 Feb 80, 6p AD-D007 336/1, PAT-APPL-943 886
Supersedes PAT-APPL-943 886-78, AD-D005 435.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A variable force control system for weapon ejection mechanisms is disclosed wherein variable ejection forces are applied after measurement of inflight aerodynamic forces on the weapon and thereupon selecting power from one or more fluid power sources of equal or unequal volume and equal or unequal pressure to effect movement of a fixed stroke power piston. (Author)

19F. Guns

AD-A085 967/8 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
a-10/GAU-8 Low Angle Firing versus Simulated Soviet Tank Company (Array 18) (30 August 1979).
Special rept.,
R. H. S. Stolfi, and R. R. McEachin. May 80, 77p Rept no. NPS-56-80-005
Contract MIPR-FY7615-78-05209

This report describes firings of the A-10/GAU-8 weapon system on 30 August 1979 against a Soviet tank company simulated by 10 combat loaded M-47 tanks. The pilots making the firing passes attacked at low altitude and used correspondingly low dive angles in order to simulate movement through a hostile air defense system. Ammunition used in the attacks comprised Lot Acceptance Verification Program (LAVP) Lot Number AJD 79181-001, Aerojet 30mm armor piercing incendiary (API) rounds, which proved to be effective damage agents against substantial areas of the U.S. MK 47 tanks used as targets. The pilots in eight successful firing passes (two targets were not attacked) fired a total of 484 rounds of which 143 impacted the targets. The projectiles impacting on targets achieved 13 perforations of the armored envelopes. Significant results include: 4 tanks immobilized and 1 tank silenced.

20. PHYSICS

20A. Acoustics

AD-A086 003/1 PC **A09**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Acoustical Scattering from the Impedance Covered Straight Edge and Wedge; The Exact Theory.
Technical memo.,
E. J. Skudrzyk. 3 Jan 75, 177p Rept no. ARL/PSU/TM-75-01
Contract N00017-73-C-1418

The analytic extension of the Fourier integral from the half space to wedge-like spaces leads to Sommerfeld type integrals. Theorems derived by Malyuzhinets in conjunction with new methods of handling Fourier Laplace integrals make it possible to apply the boundary conditions to the integrand to determine the integrand function and thus to determine the solution from the boundary conditions. The resulting Malyuzhinets functions can then be closely approximated by simple expressions for real and complex arguments.

AD-A086 008/0 PC **A11**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
A Study of the Nearfield of an Excited Spherical Shell.
Doctoral thesis,
Edmond Wong. 17 Mar 80, 232p Rept no. ARL/PSU/TM-80-30
Contract N00024-79-C-6043

In this study, the acoustic near field of excited spherical shells is investigated. The interaction of the acoustic medium with the vibration response of an elastic spherical shell due to an excitation by a point force or an acoustic point source is investigated analytically and experimentally. Thus, only axisymmetric, nontorsional motion of the spherical shell is considered, with a thin shell theory that includes extensional and bending deformation. The elastic spherical shell resonances were computed

when in vacuo and when submerged in light (air and heavy (water) acoustic medium. These were verified experimentally by testing two duralumin shells, a = 8 inches in radius and wall thicknesses h = 0.0514 and 0.1069 inch. The measured resonance frequencies were within 5% of those predicted in air and in water for identified mode numbers up to 34. The measured mean-line driving point admittance also agreed well with the predicted ones to within 3 dB.

N80-26676/0 PC **A03**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F. R.). Betriebsbereich Ottobrunn.
Development of an Exhaust Noise Suppressor with Negligible Back Pressure.
Final Report.
P. J. Vandenbrulle. May 79, 33p BMFT-FB-HA-79-02
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Methods of exhaust noise reduction were studied using mufflers of small sizes and negligible back pressures. One muffler was designed to permit the adding in series of an ejector with ejector chamber and achieved a noise reduction of 28 dB with negligible pressure loss. Another muffler was developed using a combination of ejector effect, partitioning of the jet stream, and acoustic absorption. This muffler achieved a noise reduction of 22 dB with no pressure loss.

N80-27157/0 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Application of Imaging and Ultrasound to the Quality Grading of Beef.
V. J. Anselmo, and P. M. Gammell. 1 Apr 80, 41p NASA-CR-163276, JPL-80-33
Contract NAS7-100
Sponsored in Part by Dept. Of Agriculture. Original Contains Color Illustrations.

The results of a study conducted to assist the Department of Agriculture in the task of considering innovative methods for the grading of carcass beef for human consumption is presented. The processing of photographic, television and ultrasound images of the longissimus dorsi muscle at the 12/13th rib cut was undertaken. The results showed that a correlation could be developed between the quality grade of the carcass as determined by a professional grader, and the fat to area ratio of the muscle as determined by image processing techniques. In addition, the use of ultrasound shows the potential for grading of an unsliced carcass or a live animal.

N80-27159/6 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
Broadband Jet Noise Amplification by a Pure Tone Excitation.
Semiannual Report.
P. J. Morris. 14 Jul 80, 24p NASA-CR-163269
Grant NSG-1580

A model is proposed for the change in turbulent structure of a round jet in the presence of an acoustic excitation. The excitation is initial amplitude at the jet exit. As these waves propagate downstream they extract energy from the mean flow and transfer it to the random turbulence. This results in an increase in the levels of the turbulence and a resulting increase in the radiated broadband noise. An examination is made of the effect of excitation level and frequency on the jet flow. The numerical procedure allows for radial as well as axial variations in the averaged properties of jet to be calculated. The results indicate that the presence of a finite amplitude instability wave increases the spreading of the jet.

PAT-APPL-6-138 773 PC **A02**/MF **A01**
Department of the Navy Washington DC
Small Hydrophone that is Directional at Low Frequencies.
Patent Application,
Anthony J. Rudgers. Filed 10 Apr 80, 18p AD-D007 323/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a small hydrophone that is directional at low frequencies. Directional characteristics are achieved by making the device small compared to the wavelength of the wave detected by exploiting the directionality of Rayleigh scattering. The hydrophone includes two small-diameter piezoceramic sheils, one larger than the other, mounted in rubber rings a fixed distance from each other with their centers on the same horizontal plane within a long, expanded-metal cylinder. The metal cylinder is covered by a rubber boot to ensure a water tight housing. Both hydrophones are omnidirectional in the horizontal plane and each has a sensitivity that is constant over the desired frequency range. The device can be used for detecting low-frequency sound waves in a fluid medium. A similar arrangement of antennas can be used to detect electromagnetic waves in free space or a dielectric medium. (Author)

PATENT-4 203 165 Not available NTIS
Department of the Navy Washington DC
Acoustic Filter.
Patent,
Herbert V. Hillery. Filed 24 Oct 56, patented 13 May 80, 7p AD-D007 353/6, PAT-APPL-618 160
Supersedes PAT-APPL-618 160-56.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A hydroacoustic filter adn detecting device of the character described comprising an electrolytic detector cell having an acoustical resistance and an inertance in series therewith and an asymmetrical acoustical filter network, said filter network including means providing a pair of input acoustical capacitances with one each thereof disposed in each of the two sides of the filter to be subjected to a signal input, means including straight tube for providing acoustical resistance and inertance in output shunting relation to said input capacitances, acoustical capacitance means and a straight tube acoustical resistance-inertance means connected in series in one side of said filter and following said shunting resistance and inertance, an acoustical capacitance means in the other side of the filter and connected in an acoustical shunting relation between said input shunting straight tube connection and the output termination of said series connected capacitance and resistance-inertance to provide one output terminal of said filter, said electrolytic detector cell being connected i shunting relation to said last named acoustical capacitance means with one output termination common to said first meantioned filter output termination and a second output termination connected in impedance dividing relation between the acoustical capacitance provided by said detector cell and the series inertance and acoustical resistance thereof. (Author)

PB80-195142 PC **A06**/MF **A01**
Instituto Nacional de Tecnologia Industrial, Buenos Aires (Argentina).
Confort Acustico Estudio piloto en el Barrio General Savio ex Villa Lugano I y II (Acoustic Comfort),
H. G. de Dayan, J. C. Gimenez de Paz, and A. Behar. 1977, 107p Boletin Tecnico-20
Text in Spanish.

The study emphasizes the measurement of sound and the evaluation of them. The need for acoustic regulations for the construction industry and individual dwellings are discussed. The composition of regulations of this type by imitation of similar laws from other more developed countries is presented.

20B. Crystallography

AD-A085 932/2 PC **A03**/MF **A01**
General Electric Corporate Research and Development Schenectady NY
Aluminum Nitride Crystal Growth.
Final rept. 1 Nov 78-31 Oct 79,
G. A. Slack. Dec 79, 32p SRD-80-056, AFOSR-TR-80-0424
Contract F49620-78-C-0021

This report summarizes the progress made during the year in growing single crystals of AlN from precursors prepared by the reaction of high purity aluminum droplets with ammonia. Crystal growth was achieved by vapor phase transport and sublimation. A new scheme for preparation of AlN from metal-organics is proposed. (Author)

AD-A085 961/1 PC **A03**/MF **A01**
Texas A and M Univ College Station Dept of Chemistry
X-Ray Crystal Structure Analysis of Radical Bisphthalocyaninatoneodymium(III).
Technical rept.,
K. Kasuga, M. Tsutsui, R. C. Pettersen, K. Tatsumi, and N. Van Opdenbosch. Jun 80, 27p
Rept no. TR-37
Contract N00014-75-C-0417

The molecular structure of bisphthalocyaninatoneodymium(III) has been determined by three-dimensional X-ray analysis. The orthorhombic cell dimensions and space group are a = 8.030(4), b = 22.925(7), and c = 28.315(7) A; Z = 4; V = 5212.4 (3.3 A); and P2 sub 1 2 sub 1 2 sub 1. The final parameters were determined from 3505 independent reflections. The least-squares fitting of the data refined to R sub 1 = 7.4%. A neodymium ion occupies a central position between two parallel, but staggered (45 deg) phthalocyanine ligands. The average of the eight Nd-N bond distances is 2.47(4) A. While one of the phthalocyanine macrocycles is slightly saucer-shaped towards the neodymium atom, the other is planar; angles of tilt range from 2.5 to 7.0 deg. The neodymium atom is an equal distance of 1.47(1) A from each of the two macrocyclic planes. From EPR measurements, the title complex was found to contain an organic-free radical (g-2.0029). Magnetic susceptibility measurements also demonstrated that the title complex contains one organic-free radical which could have an exchange interaction with f-electrons of the central neodymium(III) ion. (Author)

AD-A086 012/2 PC **A03**/MF **A01**
Varian Associates Inc Palo Alto CA
Investigation of InP Technology.
Final technical rept. 1 Aug 78-1 Aug 79,
George A. Antypas. Jan 80, 33p RADC-TR-79-330
Contract F19628-77-C-0141

The reaction rate for the synthesis of high-purity InP has been increased to 2.5 cm/day by increasing the reservoir temperatures to 460 C and 1040 C for P and In respectively. Characterization of the material by van der Pauw and photoluminescence measurements indicates the same background carrier concentration as that prepared at lower temperatures and therefore lower rates. Zero dislocation density n(+) S-doped and p(+) Zn-doped InP single crystals can be prepared routinely by LEC. (Author)

ORNL/TM-7247 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Effective Diffusion Coefficients of Point Defects in Impure Materials.
L. K. Mansur. Mar 80, 27p
Contract W-7405-ENG-26

Effective diffusion coefficients of vacancies and interstitials in a material containing impurities are derived in terms of impurity and point defect concentrations and reaction parameters. Irradiation and thermal conditions are considered. Several expressions presented earlier are reviewed. These are found to be limiting or approximate forms to a more general result. The regimes of importance of the point defect processes of thermal dissociation, trapping, recombination with bound point defects of the opposite type, and impurity-associated transport to sinks are evaluated in terms of the structure of the effective diffusion coefficients. (ERA citation 05:024375)

PB80-199516 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
User Evaluation of Crystal Data Products and Services: Questionnaire Analysis and Impact.
Final rept.,
J. K. Stalick, A. D. Mighell, and R. J. Boreni. Jun 80, 44p NBS-TN-1112

A survey was made of the needs of the users of Crystal Data Determinative Tables and related products and services of the NBS Crystal Data

Center. The results indicate a high frequency of use of Crystal Data, with particular application materials analysis and design. The survey suggests a need for the development of a rapid and inexpensive method of unit-cell determination as well as education of the scientific community in the use of the single-crystal method for identification of unknown materials. More complete coverage and consolidation of entries are also suggested. The necessity for computer-based methods of data base dissemination is indicated, with particular importance for research applications.

PB80-200488 PC **A24**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Accuracy in Powder Diffraction: Proceedings of a Symposium Held at Gaithersburg, Maryland on June 11-15, 1979.
Final rept.,
S. Block, and C. R. Hubbard. Feb 80, 557p NBS-SP-567
Sponsored in part by International Union of Crystallography, and National Research Council of Canada, Ottawa (Ontario). Library of Congress catalog card no. 80-600010.

The symposium was jointly sponsored by the NBS, the National Research Council of Canada, and the International Union of Crystallography. These proceedings contain a total of 24 invited and contributed abstracts. Many papers are followed by an edited discussion. The proceedings are divided into the following topics: Total Pattern, Instrumentation and Automation, Profile Fitting, Analysis of Peak Shape, Lattice Parameters and Indexing, Applications, and Future Opportunities in Powder Diffraction.

20C. Electricity and Magnetism

AD-A085 974/4 PC **A08**/MF **A01**
Franklin Research Center Philadelphia PA Power Information Center
Summary of the Proceedings of the Superconductivity Technical Exchange Meeting.
16 Apr 80, 174p Rept no. PIC-ELE-SC-209/1
Contract NASW-3219

Contents: Large Superconductive Magnets; Superconductivity Activities at LASL; Superconductivity Studies at Argonne National Laboratory; CFFF MHD Magnet at Argonne National Laboratory; MHD Superconducting Magnets; Fermilab's Energy Saver; LCP and 12 Tesla Programs at ORNL; Division of Electric Energy System's Superconductivity Program; Development of Standards for Practical Superconductors; Casting of Dendritic Cu-Nb Alloys for Superconducting Wire; Review of Recent Developments of Multifilamentary Nb3Sn by 'in Situ' and Cold Powder Metallurgy Processes; Superconducting Magnet Facility at NRL; Airborne Superconductor Applications; High Pressure Synthesis Program at Benet Weapons Laboratory Watervliet Arsenal; CuCl; Stability and Exciton Population Percursive to Anomalous Diagmagnetism; Navy Superconductive Machinery Development Program; and Superconducting Materials Program at NRL.

PB80-809361 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Electret Effect and Devices. 1973-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Apr 80,
C. Gilbert Young. May 80, 36p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, and the physics of operation, of electrets using a variety of dielectric materials, is covered in the cited abstracts. Numerous applications, ranging from biomedical, acoustic, and laboratory studies, to transducers in rocket exhausts, are described. (Contains 29 citations)

20D. Fluid Mechanics

AD-A085 838/1 PC **A03**/MF **A01**
California Univ San Diego La Jolla Inst of Geophysics and Planetary Physics
Solitary Waves,
John W. Miles. 1980, 35p
Contract N00014-76-C-0025, Grant NSF-OCE77-24005
Pub. in Annual Review of Fluid Mechanics, v12 p11-43 1979.

No abstract available.

AD-A085 839/9 PC **A02**/MF **A01**
California Univ San Diego La Jolla Inst of Geophysics and Planetary Physics
On Internal Solitary Waves,
John W. Miles. 6 Nov 78, 9p
Contract N00014-76-C-0025, Grant NSF-OCE77-24005
Pub. in Tellus, v31 n5 p456-462 1979.

No abstract available.

AD-A085 840/7 PC **A02**/MF **A01**
California Univ San Diego La Jolla Inst of Geophysics and Planetary Physics
On the Evolution of a Solitary Wave in a Gradually Varying Channel,
Peter Chang, W. K. Melville, and John W. Miles. 16 Feb 79, 15p
Contract N00014-76-C-0025, Grant NSF-OCE77-24005
Pub. in Jnl. of Fluid Mechanics, v95 pt 3 p401-414 1979.

No abstract available.

AD-A085 857/1 PC **A04**/MF **A01**
Engineering Analysis Inc Ames IA
Computation of Three-Dimensional Supersonic Viscous Flows in Internal Corners.
Final rept. 15 Jan 79-15 Jan 80,
John C. Tannehill, and Dale A. Anderson. Mar 80, 53p AFWAL-TR-80-3017
Contract F33615-79-C-3000

Three-dimensional, supersonic viscous flows in internal corners are computed by solving the unsteady Navier-Stokes equations subject to a local conical assumption. These governing equations are solved using MacCormack's explicit finite-difference scheme. A generalized coordinate system is employed which permits the grid to be refined near walls as well as in interaction regions so that viscous details can be properly resolved. Both shock fitting and shock capturing techniques are used. Two different corner flowfields are computed and the results are compared with experimental data and previous numerical solutions of the complete Navier-Stokes equations. (Author)

COO-4759-2 PC **A02**/MF **A01**
Illinois Univ. at Chicago Circle. Dept. of Energy Engineering.
Rate Measurement in Shock Waves with the Laser-Schlieren Technique.
J. H. Kiefer, and J. C. Hajduk. 1979, 14p CONF-7908112-1
Contract ER-78-S-02-4759
12. international symposium on shock tubes and waves, Jerusalem, Israel, Aug 1979.

The laser-schlieren or narrow laser beam deflection technique is discussed in some detail, with particular reference to its application to very fast processes. The technique is first briefly reviewed together with selected previous applications. The optics of the beam-shock wave interaction is then examined by use of the scalar formulation of Huygens' principle (Kirchoff integral), with the shock density profile introduced as a transmission coefficient. The accuracy with which the signal generated by a differential detector will reproduce the variation of the refractive index gradient in a reactive shock is discussed in terms of this formulation. The response of such a detector to passage of a curved shock in a rare gas is also determined with the aid of the shock-curvature theory of de Boer. These calculations are in good agreement with experiment and locate the time origin - coincidence of shock leading edge and beam center - on the positive portion of the signal near zero-crossing, an assignment that is in disagreement with the earlier calculations of Dove and Teitelbaum. This time origin shift and the averaging of initiation over a curved front can combine to generate a large correction of total density change measurements in relaxation experiments. 11 figures. (ERA citation 05:023205)

LA-8219-M PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
MIXB: A BCON Controller for Generating and Maintaining Sesame Library Files of Mixture Data.
J. Abdallah, Jr. Apr 80, 13p
Contract W-7405-ENG-36

MIXB, a BCON (LTSS) controller that generates equation-of-state and opacity data for mixtures and creates and updates Sesame library files with these data, is described. 4 figures. (ERA citation 05:023206)

N80-26633/1 PC **A03**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Numerical Estimation of the Error on the Induced Velocity Due to a Discrete Approximation of a Two-Dimensional Vortex Sheet.
A. Turi. Jun 79, 28p VKI-TN-131

A two dimensional infinite vortex sheet of the Prandtl type is considered, having along its finite width the same vorticity distribution as from the trailing edge of a symmetrically loaded wing. Four types of discretization are analyzed reproducing the vortex sheet by making use of singularities. The first and second models represent the sheet by discrete vortices, while a piecewise continuous vorticity distribution is posed by the other two models. The error analysis is based on the evaluation of the velocity induced by the discretized vorticity distribution at a certain number of points along a segment of vorticity identified with a normal section of the sheet itself. The velocities induced by each model of discretization are then compared with the corresponding exact values given by an analytical formula. The error is computed as a function of the number of singularities, discrete or continuous, used by each to reproduce the actual vortex sheet.

N80-26665/3 PC **A03**/MF **A01**
Connecticut Univ., Storrs. Dept. of Mechanical Engineering.
Turbine Endwall Two-Cylinder Program.
Semiannual Report, 1 Jan. - 1 Jul. 1980.
L. S. Langston. 1 Jul 80, 49p NASA-CR-163026, SASR-3
Grant NSG-3238

Progress is reported in an effort to study the three dimensional separation of fluid flow around two isolated cylinders mounted on an endwall. The design and performance of a hydrogen bubble generator for water tunnel tests to determine bulk flow properties and to measure main stream velocity and boundary layer thickness are described. Although the water tunnel tests are behind schedule because of inlet distortion problems, tests are far enough along to indicate cylinder spacing, wall effects and low Reynolds number behavior, all of which impacted wind tunnel model design. The construction, assembly, and operation of the wind tunnel and the check out of its characteristics are described. An off-body potential flow program was adapted to calculate normal streams streamwise pressure gradients at the saddle point locations.

20E. Masers and Lasers

AD-A086 159/1 PC **A08**/MF **A01**
Naval Research Lab Washington DC
DARPA-NRL Laser Program Annual Technical Report to Defense Advanced Research Projects Agency.
Annual rept. 1 Oct 78-30 Sep 79,
L. Champagne. 30 Apr 80, 157p NRL-MR-4217, AD-E000 436
DARPA Order-2062

The DARPA-NRL program is concerned with the development of laser technology. The basic physics of the XeCl laser have been examined theoretically and experimentally. The basic physics behind the improved performance of the XeF laser at elevated temperature is reported. The limitations of the $Kr2F^*$ laser have been studied. Preliminary experiments involving two other promising visible lasers (HgBr, XeF(C to A transition)) are reported.

DOE/DP/40001-1 PC **A03**/MF **A01**
Acton Research Corp., MA.

Krypton Fluoride Laser Mirror Study. Final Report, October 1978-November 1979.
B. K. Flint, A. Najmi, and L. A. Stelmack. Dec 79, 33p
Contract AC08-78DP40001

Rare gas halide lasers at 193 and 248/nm will require lower-loss optics if mirrors ad windows are not to be limiting factors in advanced DOE applications in laser fusion and photochemistry. This project addresses this problem in a number of ways, including materials investigations, test coatings, and fabrication of new uv laser coating designs, as described in more detail in the previous quarterly reports. Described in the final report are the process of making uv laser mirrors and the experimental strategy for attempting to improve them. Materials research is essential, and included selection and deposition of several condidate materials and an approximate ranking of their optical properties, so that new material combinations could be chosen, computer simulated, and deposited using improved vacuum techniques. Analysis of the electric fields within a laser mirror were employed to lower coating loss. A summary of test data is included, along with remarks on the survivability of uv laser optics, and possible future areas of inquiry, if truly low-loss uv laser mirrors are to ever be developed. (ERA citation 05:024521)

NRCN-473 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Design and Construction of a Copper-Halide Laser.
Sh. Gabay, I. Smilanski, G. Erez, and L. A. Levin. Mar 79, 22p
U.S. Sales Only.

The considerations necessary for the design and construction of an inexpensive, reliable copper halide laser are presented. A broad range of parameters which govern the output of the double-pulse copper-halide laser was studied. The laser has an optimum operating temperature which is different for each halide uCl, CuBr, CuI), but corresponds to a halide vapor pressure of about 0.1 torr for all three halides. At low repetition rates the highest laser output is achieved with helium as buffer gas. The laser output increases linearly with laser tube cross-section. As the tube diameter is increased, the dissociation energy must be increased, but not the excitation energy. A thyratron bias circuit has been developed which permits both dissociation and excitation pulses to be obtained from the same capacitor (with a small delay) without thyratron latch. Use of the single thyratron reduces the laser cost considerably. A laser tube with an operating life of many hundreds of hours has been designed. The description of a laser with an output of 0.5 mJ per pulse at repetition rates of up to 120 pulses per second is given. The design and construction of various components of this laser are given in detail. (Atomindex citation 11:502992)

PAT-APPL-6-137 066 PC **A02**/MF **A01**
Department of the Navy Washington DC
Multiwavelength Self-Pumped Solid State Laser.
Patent Application,
Leon Esterowitz, and Robert Eckardt. Filed 3 Apr 80, 13p AD-D007 324/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A new class of solid-state laser is disclosed which employs self-pumping from internal laser transitions to achieve inversion in other transitions. A LiYF4 laser having an activator of trivalent holmium is pumped by a standard flashlamp or by a doubled Nd laser to populate the 5S2 manifold. Inversion is achieved between 5S2 and 5I5 at 1.4 micrometers. Employing appropriate mirrors, inversion is then produced between 5I5 and 5I7 at 1.7 micrometers. Finally inversion is obtained between 5I7 and 5I8 at 2.06 micrometers. (Author)

PATENT-4 190 327 Not available NTIS
Department of the Navy Washington DC
Deformable Liquid Mirror.
Patent,
Richard S. Hughes. Filed 16 Oct 78, patented 26 Feb 80, 5p AD-D007 337/9, PAT-APPL-951 533 Supersedes PAT-APPL-951 533-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a liquid mirror for high energy lasers. A working liquid such as mercury, is used as the reflecting surface for laser light. Dielectric enhanced reflecting techniques can be used to increase significantly the amount of reflection from the working liquid. The liquid is contained in a pressure cell behind a transparent optical flat. By varying the pressure cell of the liquid, compensation for the aberration caused by heat absorption can be made. These same pressure changes can be used to correct for laser beam wavefront distortions produced elsewhere in the laser, director or atmosphere. (Author)

PATENT-4 207 542 Not available NTIS
Department of the Air Force Washington DC
Multiple Shock Aerodynamic Window.
Patent,
Peter I. Shen. Filed 20 Apr 78, patented 10 Jun 80, 7p AD-D007 373/4, PAT-APPL-898 049 Supersedes PAT-APPL-898 049-78, AD-D004 959.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

a multiple shock aerodynamic window is disclosed for use within a laser system. The aerodynamic window provides separation between the pressure within the laser cavity and the ambient pressure adjacent thereto. Making up the aerodynamic window is an entrance duct and a capture duct situated transverse to a laser beam output passageway leading from the laser cavity. A wedge-shaped element is located in the entrance duct, partially protruding into the passageway. A diffuser vane is located in the capture duct. Upon the passing of a supersonic flow of gas through the entrance duct at least two shock waves are generated at the wedge-shaped element and cross the passageway. The diffuser vane intersects at least one of the shock waves thereby substantially reducing flow separation in the capture duct. In addition, the entrance wall of the capture duct may be inclined at an angle of approximately 16 deg in order to assist the diffuser vane in the reduction of flow separation in the capture duct. (Author)

PB80-808892 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Double Heterostructure Used in Diode Lasers and Light Emitting Diodes. 1972-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Apr 80,
C. Gilbert Young. May 80, 114p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of a double heterostructure, or double heterojunction, in the construction of semiconductor lasers and light emitting diodes (LEDs), is detailed in the cited abstracts. Crystal growth and doping, fabrication methods, overall laser or LED design and construction, and performance data are presented for a variety of double heterostructure devices. Numerous applications are described. (Contains 121 citations)

PB80-808900 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Double Heterostructure Used in Diode Lasers and Light Emitting Diodes. 1972-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1972-Apr 80,
C. Gilbert Young. May 80, 132p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of a double heterostructure or double heterojunction in the construction of semiconductor lasers and light emitting diodes (LEDs), is detailed in the cited abstracts. Crystal growth and doping, fabrication methods, overall laser or LED design and construction, and performance data are presented for a variety of double heterostructure devices. Numerous applications are described. (Contains 138 citations)

PB80-809114 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Gyroscopes. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 91p
Sponsored in part by National Technical Information Service, Springfield, VA.

Laser inertial rotation sensors is the subject of this collection of citations from the world literature. Ring lasers, fiber optic ring lasers, and laser or optical gyroscopes are designations used and discussed here. Technical problems, such as mode coupling and competition, stray scattering, error sources, and analyses, are treated. The design, engineering, construction, and performance of operational hardware are described. (Contains 72 citations)

PB80-809122 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Gyroscopes. 1970-February, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Feb 80,
C. Gilbert Young. May 80, 116p
Sponsored in part by National Technical Information Service, Springfield, VA.

Laser inertial rotation sensors is the subject of this collection of citations from the world literature. Ring lasers, fiber optic ring lasers, and laser or optical gyroscopes are designations used and discussed here. Technical problems, such as mode coupling and competition, stray scattering, error sources, and analyses, are treated. The design, engineering, construction, and performance of operational hardware are described. (Contains 129 citations)

PB80-809130 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Laser Gyroscopes. 1977-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1977-Apr 80,
C. Gilbert Young. May 80, 137p
Sponsored in part by National Technical Information Service, Springfield, VA.

Laser inertial rotation sensors is the subject of this collection of citations from the world literature. Ring lasers, fiber optic ring lasers, and laser or optical gyroscopes are designations used and discussed here. Technical problems, such as mode coupling and competition, stray scattering, error sources, and analyses, are treated. The design, engineering, construction, and performance of operational hardware are described. (Contains 146 citations)

PB80-809213 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Neodymium Glass Lasers. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. Jun 80, 161p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, construction, and uses of neodymium glass lasers are covered in the cited works. Some articles on laser glass design and manufacture are included. Applications of glass lasers in drilling, cutting, and welding of materials, as diagnostic tools in semiconductor research and other physical measurements, and in thermonuclear fusion, are discussed. (Contains 154 citations)

PB80-813223 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Neodymium YAG Lasers. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Brian Carrigan. Jul 80, 186p
Supersedes NTIS/PS-79/0883 and NTIS/PS-78/0808.

Federally-funded research reports on lasing of neodymium doped yttrium aluminum garnet are cited. Studies on design, fabrication, quantum efficiency, light pulses, stabilization, and testing are covered. Optical pumping, mode locking, frequency conversion, and modulation of these lasers are discussed. Laser applications such as optical communications, range finding, and tracking are included. Safety hazards and radiation damage related to neodymium YAG lasers are also covered. (This updated bibliography contains 181 citations, 15 of which are new entries to the previous edition.)

PB80-813520 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Gallium Arsenide Lasers. 1976-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Jul 80,
Samuel C. Mauk. Aug 80, 79p
Supersedes NTIS/PS-79/0821. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites articles from the international literature concerning the research, testing, and applications of gallium arsenide and aluminum gallium arsenide double heterojunction lasers. (This updated bibliography contains 340 citations, 114 of which are new entries to the previous edition.)

PB80-813538 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Dye Lasers. 1976-July, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-Jul 80,
Samuel C. Mauk. Aug 80, 94p
Supersedes NTIS/PS-79/0823. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography cites articles from the international literature involving continuous wave, pulsed, ultrashort pulsed, ultraviolet, and infrared lasers. Articles covering laser outputs, materials, and applications are stressed. (This updated bibliography contains 473 citations, 194 of which are new entries to the previous edition.)

20F. Optics

AD-A085 871/2 PC **A02**/MF **A01**
Army Missile Command Redstone Arsenal AL Directed Energy Directorate
A Simple Method for Treating Diffractive Propagation from a Laser with Diagnostic Optics.
Technical rept.,
R. W. Jones, J. C. Nixon, and J. F. Perkins. 19 Nov 79, 13p Rept no. DRSMI/RH-80-2

The diffractive propagation of a complex laser beam through a multi-element optical system is considered. It is shown that the problem can be easily reduced to propagation of a quasi-collimated laser beam in free space through a distance d sub eff determined by successive applications of a simple lens equation. (Author)

AD-A085 983/5 PC **A05**/MF **A01**
Corning Glass Works NY
Manufacturing Study for a Four Meter Lightweight Mirror.
Final technical rept. 4 Sep-30 N0v 79,
W. E. Bliss, and P. C. Cleveland. Apr 80, 83p
RADC-TR-80-103
Contract F30602-79-C-0225, ARPA Order-3503

This study was performed to determine the feasibility of manufacturing a four-meter diameter lightweight mirror. It concludes that it is possible to build and assemble such a mirror. Except for grinding, present equipment can be modified to handle this size mirror. A grinding machine capable of handling this size is commercially available. This study identifies three developments which should be accomplished in order to minimize the risk of such an undertaking. (Author)

AD-A085 992/6 PC **A04**/MF **A01**
Itek Corp Lexington MA Optical Systems Div
Research and Design of PROM Coherent Optical Processor.
Final technical rept. 25 Sep 79-7 Mar 80,
Francis J. Corbett, Richard A. Tuft, W. Faccenda, R. Copper, and A. Rux. 10 Apr 80, 51p ITEK-9565-62, ETL-0219
Contract DAAK70-79-C-0164

This program produced a design for a coherent optical image processor utilizing a PROM(s). The PROM Coherent Optical Processor or PCOP is a subsystem of the USAETL Hybrid (Optical/Digital) Image Processor. The design and supporting analysis tasks are detailed in the report. The purpose of development of this processor is to evaluate automatic image feature extraction algorithms. The PCOP is a two PROM Fourier plane filter processor which operates in the following manner. The first PROM is the input image plane. Imagery is scaled through a lens system and then manipulated in intensity space at the input PROM. The image transform is taken next in the processing sequence and then filtered at the second PROM. Filters are generated with a laser optical scanner. The reconstructed image is produced on a charge integrating camera and displayed on a CRT. Image quality and data throughput were determined and the PCOP design was made to insure the output quality was compatible with the USAETL program objectives.

AD-A086 089/0 PC **A05**/MF **A01**
Itek Corp Lexington MA Optical Systems Div
High Bandwidth, Fine Resolution Deformable Mirror Design.
Final rept.,
Ralph E. Aldrich, Jeffrey H. Everson, and Nedo P. Albertinetti. Mar 80. 80p ITEK-8432, AFWL-TR-79-5, AD-E200 495
Contract F29601-78-C-0060

This report describes the design, fabrication and testing of five candidate actuator types to achieve a deformable mirror capable of 6 microns dilatation at 1.5 kV. The actuator types are the coherent stack, bimorph, tube, multilayer and the honeycomb.

AD-A086 115/3 PC **A06**/MF **A01**
University of Southern California Los Angeles
Waveguide Studies for Fiber Optics and Optical Signal Processing Applications.
Final technical rept. 11 Sep 77-10 Sep 79,
Elsa Garmire. Apr 80, 115p RADC-TR-80-82
Contract F19628-77-C-0221

This report describes investigations of waveguide components for use in multimode fiber optics and in optical signal processing. Measurements of beam expansion and polarization properties of distributed Bragg deflectors are described. Measurements of the characteristics of DBR lasers are detailed, with emphasis on those properties which are relevant to their use as sources to couple to the waveguide beam expander. Studies of the mechanisms for loss in LiNbO3 waveguides are described and techniques to reduce the waveguide loss in LiNbO3 modulators are outlined. Finally, preliminary experiments on electro-thermal diffusion in LiNbO3 are described. (Author)

LBL-10172 PC **A03**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Conventions and Formulas for Using the Mueller-Stokes Calculus in Ellipsometry.
P. S. Hauge, R. H. Muller, and C. G. Smith. Dec 79, 41p CONF-790857-3
Contract W-7405-ENG-48
International conference on ellipsometry, Berkeley, CA, USA, 20 Aug 1979.

An analysis of the compatability of ellipsometry conventions with the Mueller-Stokes calculus has shown that, for the two approaches to be consistent, modifications to the 1968 Nebraska ellipsometry conventions are necessary. A sign convention is proposed which specifies the ellipticity angle and the fourth Stokes parameter to be positive when the tip of the instantaneous electric-field vector describes a right-handed helix in space. Polarization of this type is designated as right-handed and represented by a point on the northern half of the Poincare sphere. The consequences of using this convention, along with the previously adopted e/sup i(wt + delta)/ convention for the electric field, are seen in the relation among several representations of polarization state. These include the magnitudes and phases of the electric field components, the Jones vector, coherency matrix, Stokes parameters, Poincare sphere, polarization ratio, ellipsometric parameters psi and delta , and the azimuth and ellipticity of the polarization ellipse. The formalism for converting the Jones matrix into the matrix that transforms the coherency vector or the Stokes vector (Mueller matrix) is described. Mueller matrices for a linear retarder and an isotropic reflecting surface and the description of a compensator-analyzer polarimeter are given. 6 figures. (ERA citation 05:024971)

N80-26572/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Electro-Optics Laboratory Evaluation: Deutsch Optical Waveguide Connectors.
Jun 80, 39p NASA-TM-74108, KSC-TR-32-1

A description of a test program evaluating the performance of an optical waveguide connector system is presented. Both quality and effectiveness of connections made in an optical fiber, performance of the equipment used and applicability of equipment and components to field conditions are reviewed.

PAT-APPL-6-140 352 PC **A02**/MF **A01**
Department of the Navy Washington DC
Multi-Color Tunable Filter.
Patent Application,
Nicholas Bottka, and Howard Lessoff. Filed 14 Apr 80, 9p AD-D007 321/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A semi-conductor multi-color tunable filter is created by multiple epitaxial layers of varying composition. An AC modulation voltage is superimposed on a sweep bias, periodically shift the fundamental absorption edge of each individual epitaxial layer. This arrangement permits a unique voltage to be associated with a particular color. A lock-in filter matches colors observed at a detector with the voltage present for a given observation. (Author)

PAT-APPL-6-150 389 PC **A02**/MF **A01**
Department of the Navy Washington DC
Pivotal Support with Independent Adjusting Elements and Locking Means.
Patent Application,
Roger H. Lapp. Filed 27 May 80, 13p AD-D007 310/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses an optical element support capable of pivoting an optical element on its horizontal and vertical axes. The pivoting adjustments are facilitated by spaced threaded rods screwed into a support element and abutting a surface element extending from a receptacle containing the optical element. The surface element is capable of flexure without causing distortion of the receptacle. The optical element support has a locking element which prevents pivoting in the locking mode. (Author)

PAT-APPL-6-150 522 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Lens System Having Wide Angle Objectives.
Patent Application,
James G. Baker. Filed 16 May 80, 23p AD-D007 363/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses wide angle optical objectives for use in aerial mapping cameras to provide improved resolving power and improved contrast rendition derived from the pattern of glass types and lens data employed. The outermost elements are weakly positive menisci to produce an initial convergence of rays before the mating negative elements are introduced thereby keeping the physical length of the system within modest proportions. Strong negative elements lying outside of

centrally located strong positive elements provide favorable illumination over a wide angle field. Wafer elements near the center of the system serve to minimize chromatic astigmatism and to reduce the actual sagittal depth of the aspherics. Wafers of high index flint glass are located next to the central stop in order to obtain good chromatic spherical correction in the tangential rays over the field. (Author)

PAT-APPL-6-162 347 PC **A02**/MF **A01**
Department of the Navy Washington DC
Luminescent Hafnia Composition.
Patent Application,
Philip H. Klein, Arrigo Addamiano, and Roger Allen. Filed 23 Jun 80, 10p AD-D007 296/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A cubic, yttria stabilized hafnia phosphor, doped with Ce(3+), has been discovered. The phosphor has a blue luminescense, peaking at about 4200A, with a secondary peak in the 3800-4000A region. The optimum composition is 3 HF2O:Y2O3:Ce(3+) where the Ce(3+) dopant ranges from 0.1-1.0 weight %.

PATENT-4 178 404 Not available NTIS
Department of the Navy Washington DC
Immersed Reticle.
Patent,
Edwin M. Allen, William C. Fitzgerald, Henry Blazek, and George Turner. Filed 6 Feb 78, patented 11 Dec 79, 4p AD-D007 329/6, PAT-APPL-875 062
Supersedes PAT-APPL-875 062-78, AD-D005 094.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of Patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A low reflectance reticle immersed in optical cement between transparent substrates is disclosed. A copper reticle is vacuum deposited upon one transparent substrate and chemically treated to produce anti-reflectance properties. The reticle and substrate to which it is attached are then cemented with optical cement to a second transparent substrate to immerse the anti-reflectance reticle between transparent substrates in optical cement. The immersed reticle thus formed has superior anti-reflection properties and is protected from mechanical damage by its immersed location. Immersed reticles may be installed between elements of a compound lens if desired. (Author)

PB80-201783 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Photometry and Colorimetry of Retroreflection: State-of-Measurement-Accuracy Report.
Final rept.,
Kenneth L. Eckerle. Jul 80, 47p NBS-TN-1125

A survey of the literature on retroflection has been conducted and information from this survey necessary for the understanding of the phenomenon of retroreflection is summarized. Items included are materials, measurement geometry, quantities to be measured, instrumentation, and methods of calibration. Recommendations are given to evaluate or to write specifications by discussing important parameters. A partial list of test methods and specifications is presented in tabular form. Some prior research and intercomparisons are summarized including the results. The state-of-measurement-accuracy is inferred from the information presented. A bibliography is included for those who would like to obtain more details.

PB80-813280 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquid Crystals. 1976-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Jun 80,
Diane M. Cavagnaro. Jul 80, 120p
Supersedes NTIS/PS-79/0796 and NTIS/PS-78/0767. See also 1964-1975, NTIS/PS-79/0795.

Research studies on optical properties, phase transformations, chemical and physical properties, molecular structure, synthesis, and testing of liquid crystals are cited. This compilation includes the use of liquid crystals in display systems, fiber optics, memory devices, and test equipment. (This updated bibliography contains 113 citations, 22 of which are new entries to the previous edition.)

20G. Particle Accelerators

ACC-6 PC **A03**/MF **A01**
Argonne National Lab., IL.
Hearthfire Reference Concept No. 3. A Rapid Cycling Synchrotron System.
R. C. Arnold, R. J. Burke, M. H. Foss, T. K. Khoe, and R. L. Martin. 16 Jun 78, 32p
Contract W-31-109-ENG-38

This report describes a reference design for an accelerator system for heavy ion fusion based on a rapid cycling synchrotron and storage rings. The system irradiates one fusion target per second with 1 MJ, 100 TW (peak) pulses of 20 GeV Xe exp +8 . The major components are a 550 MV linac, eight 60 Hz synchrotrons, four matching rings, 16 storage rings, and 24 final beam lines and lenses. (ERA citation 05:024551)

BNL-51103 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Beam-Beam Effects in Curvilinear Interaction Regions in ISABELLE.
M. Cornacchia, and G. Parzen. Oct 79, 19p
Contract EY-76-C-02-0016

The presence of experimental apparatus in the interaction regions of an intersecting beam accelerator changes the configuration of the crossing beams. This changes the space-charge forces with respect to the standard, magnet-free crossing. There is strong interest in instrumenting one of the intersections at ISABELLE with a major spectrometer facility, which involves a large aperture dipole magnet located at the intersection of the beams. Various configurations of the dipole spectrometer have been proposed, and they are analyzed in this paper from the point of view of the perturbation introduced to the beam-beam interaction. (ERA citation 05:022851)

BNL-51154 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Stop Bandwidths of Nonlinear Beam-Beam Resonances.
G. Parzen. 8 Dec 79, 11p
Contract EY-76-C-02-0016

A general expression is given for the stop bandwidths, delta nu /sub N/, of nonlinear beam-beam resonances, which is expanded in powers of Y(s), the vertical beam orbit, and which is valid under certain assumptions regarding the orbits and charge distributions near the interaction regions. This result is applied to obtain results for the rms delta nu /sub N/ due to random vertical orbit errors, and due to random errors in beta /sub y/ at the crossing points. Numerical results are given for the ISABELLE storage accelerator. (ERA citation 05:022842)

CEA-CONF-4449 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Preparation of Self-Supported (100 to 200 mu G/cm exp 2) Tritiated Titanium Targets.
C. Bonetti. 1978, 7p
U.S. Sales Only.

The construction of self-supported (100 to 200 mu g/cm exp 2) tritiated titanium targets is described. These targets are used with particle accelerators for the production of neutrons and for the absolute calibration of neutron detectors by the associated particle method. The tritium inclusion technique and the materials used are described, and the results of chemical and metallurgical analyses are presented. (Atomindex citation 11:498947)

CONF-790976-10 PC **A02**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
UNISOR Facility: Recent Developments and Future Directions.
E. H. Spejewski, and R. L. Mlekodaj. 1979, 7p
Contract W-7405-ENG-26

International symposium on future directions in studies of nuclei far from stability, Nashville, TN, USA, 10 Sep 1979.

The UNISOR isotope separator is described. This facility is presently on line to the Oak Ridge Isochronous Cyclotron, and will also be on line to a 25-MV folded tandem accelerator when the latter is completed. Intended primarily for the study of nuclei far from stability by means of radioactive-decay spectroscopy, the facility is designed and has been expanded to do multiple experiments simultaneously. This ability makes possible the completion of many studies that can expose the systematic behavior of nuclear structures over a relatively wide mass range. Aspects of the facility discussed include the following: the isotope separator itself, ion sources, available heavy-ion beams and beam handling equipment, collection systems, and data acquisition and handling. 3 figures. (ERA citation 05:024552)

DL-NUC-R-18A PC **A02**/MF **A01**
Science Research Council, Daresbury (England). Daresbury Lab.
Calculations Following Voltage Breakdown in a Single-Ended Van de Graaff with an Accelerator Tube.
J. A. Staniforth. 1979, 17p
U.S. Sales Only.

Calculation of voltages and voltage gradients in the terminal, along the insulating column and the accelerating tube are described for various breakdown positions. The method uses a number of inverted-L network sections to represent the machine assuming that the tube is coupled to the column. Various forms of coupling are examined. The calculations use an iterative computer program which calculates the voltages and currents in the networks at successive small time intervals. (Atomindex citation 11:502839)

DOE/TIC-11151 PC **A02**/MF **A01**
Houston Univ., TX.
Kaon Elastic and Inelastic Scattering with the BNL Spectrometer.
E. V. Hungerford. 1979, 17p
Contract EY-76-S-05-3948

The beam line and the spectrometer are discussed in some detail. Also critical consideration is given to the present data, particularly the elastic scattering data from exp 12 C to determine the internal consistency of the data and the assigned error. (ERA citation 05:022847)

GEPP-TIS-481 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Tube Outgassing Characteristics.
C. R. Winkelman. 24 Apr 80, 14p
Contract EY-76-C-04-0656

This investigation measured the quantity of six different gases desorbed from a vacuum system and from neutron tubes evacuated by that system. The results show that the quantity of gas contributed by the system is negligible at the 500 exp 0 C operating temperature. Also shown is that 99.0 percent of the desorbed gases are removed by normal processing by the system. (ERA citation 05:022848)

IFVE-OP-79-63 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Polarized Photons from Si Monocrystal in 31 GeV Electron Beam of the Serpukhov Accelerator.
V. A. Maisheev, A. M. Frolov, and R. O. Avakyan. 1979, 20p
In Russian.
U.S. Sales Only.

A tagged photon beam coherently emitted in Si monocrystal by electron beam with energy E/sub e/ = 31 GeV and intensity 4x10 exp 4 particle/pulse at pulse duration up to 1.7 s has been obtained at the Serpukhov proton accelerator. The intensity of photons in each of the five energy intervals with total range k=8.2-24.2 GeV was approximately 10 exp -1 -10 exp -2 gamma /e exp - at the calculated linear polarization of approximately 50-20%. The method for experimental orientation

of the monocrystals in electron beams of the proton accelerator is described. Varying the orientation of the Si monocrystal produces narrow peaks in radiation intensity that cannot be explained. (Atomindex citation 11:502821)

IPNO-79-01 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
CRYEBIS, An Exotic Source for the Synchrotron Saturne 2.
J. Arianer, S. Buhler, A. Cabrespine, C. Goldstein, and M. Ulrich. 1979, 38p
In French.
U.S. Sales Only.

An EBIS has been built to provide nuclei up to Ne exp 10+ (10 exp 10 ppp) and polarized particles (3 x 10 exp 11 with storage). This EBIS uses a superconducting solenoid (3T, 1.5m long). The electron density is higher than 10 exp 3 A.cm exp -2 by space charge neutralization. Results of preliminary experiments show spectra with Ne exp 10+ , A exp 18+ , Kr exp 34+ and Xe exp 44+ . (Atomindex citation 11:502787)

KEK-78-14 PC **A02**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Hamiltonian Formalism for the Study of Closed Orbits and Betatron Oscillations in a Perturbed Machine.
T. Suzuki. Oct 78, 14p
U.S. Sales Only.

The Hamiltonian formalism of Courant, Snyder and Teng for the study of betatron oscillations is extended to include field errors and momentum errors. The closed orbits and betatron oscillations in a perturbed machine can then be treated in a systematic way. (Atomindex citation 11:502840)

KEK-78-17 PC **A02**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Dispersion and Betatron Functions in Nonlinear Lattice. Computational Method.
Y. Kamiya. Oct 78, 14p
U.S. Sales Only.

A computational method for the dispersion and betatron functions in the lattice with nonlinear elements is presented. We apply the method to the lattice including sextupole elements and present a few numerical results. (Atomindex citation 11:502812)

LA-UR-80-1091 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Rf Quadrupole Linac: A New Low-Energy Accelerator.
R. W. Hamm, K. R. Crandall, and C. W. Fuller. 1980, 18p CONF-800466-1
Contract W-7405-ENG-36
International conference on low energy ion beams 2, Bath, UK, 14 Apr 1980.

A new concept in low-energy particle accelerators, the radio-frequency quadrupole (RFQ) linac, is currently being developed at the Los Alamos National Scientific Laboratory. In this new linear accelerating structure both the focusing and accelerating forces are produced by the rf fields. It can accept a high-current, low-velocity dc ion beam and bunch it with a high capture efficiency. The performance of this structure as a low-energy linear accelerator has been verified with the successful construction of a proton RFQ linac. This test structure has accelerated 38 mA of protons from 100 keV to 640 keV in 1.1 meters with a capture efficiency greater than 80%. In this paper a general description of the RFQ linac and an outline of the basic RFQ linac design procedure are presented in addition to the experimental results from the test accelerator. Finally, several applications of this new accelerator are discussed. (ERA citation 05:022849)

LA-8307-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
LAMPF Beam Line Polarimeters.
M. W. McNaughton. Apr 80, 18p
Contract W-7405-ENG-36

This report describes the beam line polarimeters that are used in the primary p exp - beams at LAMPF to monitor and measure the polarization of the beam. The devices are secondary standards of polarization and are calibrated primarily by the ion source quench ratio technique. Some independent checks of this technique are discussed. (ERA citation 05:022843)

LBL-PUB-300 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Research/Accelerators. Bimonthly Status Report of Operations, November-December 1979. Volume 4, Number 6.
J. W. Knight. 1979, 60p
Contract W-7405-ENG-48

Topics covered include: a survey of the Heavy Ion Spectrometer System; a report on mean free paths of tertiary particles relative to those of primaries and secondaries; the heavy ion fusion year-end report; a listing of publications and presentations from LBL accelerators group during November-December 1979; a summary of accelerator operations and research programs for the Bevatron/Bevalac, super HILAC, 88-inch cyclotron and 184-inch cyclotron; and a brief report on the PEP storage ring progress. (ERA citation 05:024555)

LBL-10720 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Accelerator and Fusion Research Division. Annual Report, October 1978-September 1979.
Mar 80, 72p
Contract W-7405-ENG-48

Topics covered include: Super HILAC and Bevalac operations; high intensity uranium beams line item; advanced high charge state ion source; 184-inch synchrocyclotron; VENUS project; positron-electron project; high field superconducting accelerator magnets; beam cooling; accelerator theory; induction linac drivers; RF linacs and storage rings; theory; neutral beam systems development; experimental atomic physics; neutral beam plasma research; plasma theory; and the Tormac project. (ERA citation 05:022845)

PATENT-4 206 383 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, CA.
Miniature Cyclotron Resonance Ion Source Using Small Permanent Magnet.
Patent,
V. G. Anicich, and W. T. Huntress, Jr. Filed 11 Sep 78, patented 3 Jun 80, 7p N80-27163/8, PAT-APPL-940 970
Supersedes PAT-APPL-940 970-78, N80-12851 (18 - 03, p 0391). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An ion source using the cyclotron resonance principle is described. A miniaturized ion source device is used in an air gap of a small permanent magnet with a substantially uniform field in the air gap of about 0.5 inch. The device and permanent magnet are placed in an enclosure which is maintained at a high vacuum (typically 10 to the minus 7th power) into which a sample gas can be introduced. The ion beam end of the device is placed very close to an aperture through which an ion beam can exit into the apparatus for an experiment.

UCRL-Trans-1592 PC **A02**/MF **A01**
Akademiya Nauk, SSSR, Novosibirsk. Inst. Yadernoi Fiziki.
Experiments on High-Current Proton BEAMS at Novosibirsk.
Yu. I. Bel'chenko, 1980, 18p
Contract W-7405-ENG-48
A 10th international conference on high energy accelerators, Serpukhov, USSR, 1977.

The present paper gives the results of the latest experiments, in which it was possible to obtain a compensated proton beam with a current considerably exceeding the space charge limit. The experiments were performed with the acceleration ring with an H exp - ion injector using a current of 20 mA at an energy of 1 MeV. The period of revolution of the protons around the orbit was 0.54 mu s, and the limiting number of protons based on the space charge was 1.9 . 10 exp 11 (by shifting the frequency nu /sub z/ from 0.85 to 0.5). The absolute space charge limit was 2.9 . 10 exp 11 protons. (ERA citation 05:024549)

UTTAC-19 MF **A01**
Tsukuba Univ., Ibaraki (Japan). Tandem Accelerator Center.
Annual Report of the Tandem Accelerator Center, Nuclear and Solid State Research Project, University of Tsukuba. April 1, 1978 - March 31, 1979.
1979, 112p
U.S. Sales Only. Microfiche copies only.

During the academic year of 1978 to 1979, the 12 UD pelletron tandem accelerator has operated successfully. Ion species used were polarized p, polarized d, alpha (from the polarized ion source), p, d, exp 16 O and exp 18 O (from the direct extraction ion source), and C, O, Cu and Au (from the sputtering ion source). Improvements were made in the detector and data acquisition system. The data handling system 'SHINE' was completed and is in full operation. Research works are reported in individual summaries under the following chapters: accelerator and beam transport system, general equipments nuclear physics, atomic and solid-state physics, and biological and medical science and others. (Atomindex citation 11:503211)

20H. Particle Physics

ANL-HEP-CP-79-51 PC **A03**/MF **A01**
Argonne National Lab., IL.
Case Studies in Perturbative Quantum Chromodynamics.
E. L. Berger. Sep 79, 34p CONF-7909104-3
Contract W-31-109-ENG-38
10. international symposium on multiparticle dynamics, Goa, India, 25 Sep 1979.

A few aspects of QCD are discussed, beginning with a discussion of the ingredients of QCD and their observational basis. A pedagogical treatment of scaling violations is presented and the argument is presented that while entirely consistent with QCD, the phenomenological situation is clouded by the potentially crucial role of higher twist effects in the theory. Some explicit calculations of higher twist effects are presented. (ERA citation 05:023248)

ANU-P-732 PC **A03**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Single-Neutron Transfer Reactions exp 76 Se, exp 78 Se, exp 80 Se,.
L. O. Barbopoulos, D. W. Gebbie, J. Nurzynski, M. Borsaru, and C. L. Hollas. Jul 79, 45p
U.S. Sales Only.

Single neutron transfer reactions on even-even Se nuclei have been studied using 33 MeV incident proton energy from the ANU cyclograaff facility. A total of 120 levels have been seen below 4 MeV excitation energy in exp 75 Se, exp 77 Se, exp 79 Se, exp 81 Se isotopes. Angular distributions for 88 states were extracted and analysed with DWBA theory yielding a number of new lsub(n) assignments. Coriolis coupling calculations have been carried out for low level spin states in all four isotopes. (Atomindex citation 11:496734)

ANU-P-733 PC **A03**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
One- and Three- Quasiparticle States in exp 171 Hf and High Spin Rotational Bands.
G. D. Dracoulis, and P. M. Walker. Jul 79, 41p
U.S. Sales Only.

The 1/2 exp - (521) and 7/2 exp + (633) 1-quasiparticle bands in the N = 99 nucleus exp 171 Hf have been identified to spins of about 45/2 using (heavy ion,xn) reactions. The moments of inertia of these bands are consistent with the absence of backbending in the N = 98 core nucleus. The half-life of the 5/2 exp - (512) intrinsic state was measured as 63.6 ns. The strength of the 5/2 exp - (512) implies 7/2 exp + (633) E1 transition is discussed. Two 3-quasiparticle isomers with spins and parities 19/2 exp + and 23/2 exp - have been identified and their suggested configurations are a 7/2 exp + (633) neutron added to the 6 exp + and 8 exp -

2-quasiproton states of the core. The moment of inertia of a rotational band based on the 23/2 exp - isomer supports this suggestion, and shows the effect of partial rotation alignment of the isub(13/2) neutron. (Atomindex citation 11:498769)

ANU-P-735 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Study of the Elastic Scattering of Polarized Deuterons from exp 60 Ni and exp 90 Zr Nuclei.
H. R. Burgi, W. Gruebler, J. Nurzynski, V. Konig, and P. A. Schmelzbach. Jul 79, 24p
U.S. Sales Only.

Five quantities, sigma sub 0 , iT sub 11 , T sub 20 , T sub 21 and T sub 22 , have been measured for the elastic (d vector,d) scattering from exp 60 Ni at 9 and 12 MeV and from exp 90 Zr at 10, 11 and 12 MeV over a wide angular range. Excitation functions for sigma sub 0 and T sub 20 have been also measured at an angle of 175 exp 0 (lab) in the approximate energy range of 6-13 MeV for both target isotopes. The experimental results, together with the similar data published earlier for 15 MeV have now been analysed using the optical model with the complex central, spin-orbit and tensor Tsub(R) potentials. Excellent fits are obtained for the angular distributions for all five measured quantities. The main features of the excitation functions are also well produced. Five of the optical model parameters can be fixed. Three other parameters can be constrained by simple mass dependence functions. Further evidence for the presence of an imaginary component of the spin-orbit potential is supplied by the analysis of the present data. (Atomindex citation 11:498747)

ANU-P-738 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Backbending in exp 178 W.
G. D. Dracoulis, and P. M. Walker. Jun 79, 8p
U.S. Sales Only.

High spin states in exp 178 W have been studied using the exp 170 Er(exp 12 C,4n) reaction, and gamma -ray techniques. The yrast band in exp 178 W has been identified to spin 18. At this spin the moment of inertia curve shows backbending. The systematics of backbending in the tungsten isotopes is discussed. (Atomindex citation 11:498770)

ANU-P-754 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Cross Section of the Reaction exp 6 Li (P, gamma) exp 7 Be.
Z. E. Switkowski, J. C. P. Heggie, D. L. Kennedy, D. G. Sargood, and F. C. Barker. Jul 79, 23p
U.S. Sales Only.

The cross section of the reaction exp 6 Li(p, gamma) exp 7 Be has been measured using Ge(Li) gamma -ray spectrometers for proton bombarding energies E/sub P/ from 200 keV to 1200 keV. At E/sub P/ = 800 keV, the total (p, gamma) integrated cross section is found to be 3.1 +- 0.4 mu b. The cross section adopted from consideration of this and previous measurements is in good agreement with that predicted from the known thermal neutron cross section for exp 6 Li(n, gamma) exp 7 Li on the assumption that properties of mirror direct capture reactions can be well described by optical potentials that use the same parameter values for the two reactions. (Atomindex citation 11:498865)

BNL-27615 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Flavor Mixing and Charm Decay.
L. C. Chau Wang. 1980, 20p CONF-800120-3
Contract EY-76-C-02-0016
Conference on theoretical particle physics, Guangchou, China, 5 Jan 1980.

The results of mixing matrix determination and their implications on heavy quark decays are given. The decays of charm mesons D exp 0 , D exp + , F exp + into two pseudoscalar mesons are discussed in the framework of SU(3) symmetry. The charm decays are also discussed in terms of quark diagrams. It is demonstrated that the differences observed in the lifetimes of D exp 0 and D exp + , and in the branching ratios B(D exp 0 implies K exp - K exp +) and B(D exp 0 implies pi exp - pi exp +) can be easily incorporated. 3 figures. (ERA citation 05:024861)

BNL-27617 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Baeklund Transformations, Conservation Laws and Linearization of the Self-Dual Yang-Mills and Chiral Fields.
L. C. Wang. 1980, 26p CONF-800120-4
Contract EY-76-C-02-0016
Conference on theoretical particle physics, Guangchou, China, 5 Jan 1980.

Baecklund Transformations (BT) and the derivation of local conservation laws are first reviewed in the classic case of the Sine-Gordon equation. The BT, conservation laws (local and nonlocal), and the inverse-scattering formulation are discussed for the chiral and the self-dual Yang-Mills fields. Their possible applications to the loop formulation for the Yang-Mills fields are mentioned. 55 references, 1 figure. (ERA citation 05:024875)

BUP-103 PC **A02**/MF **A01**
Bergen Univ. (Norway). Fysisk Inst.
Collisions Between Complex Atomic Nuclei.
J. S. Vaagen. Aug 77, 24p
In Norwegian.
U.S. Sales Only.

The use of heavy ion accelerators in the study of nuclear structure and states is reviewed. The reactions discussed are the quasielastic reactions in which small amounts of energy and few particles are exchanged between the colliding nuclei. The development of heavy ion accelerators is also discussed, as well as detection equipment. Exotic phenomena, principally the possible existence of superheavy nuclei, are also treated. (Atomindex citation 11:498869)

BUP-80 PC **A02**/MF **A01**
Bergen Univ. (Norway). Fysisk Inst.
K - Shell Ionization Probabilities of Pb at Small Impact Parameters by 25, 40 and 74 MeV alpha Particles.
R. J. Vader, A. van der Woude, R. J. de Meijer, J. M. Hansteen, and P. A. Amundsen. Jan 76, 12p
U.S. Sales Only.

The absolute K-shell ionization probabilities of Pb at very small impact parameters by 25, 40 and 74 MeV alpha particles have been measured in an alpha-X-ray coincidence experiment, using the slight inelasticity of the scattered alpha-particles. The ionization probabilities are at 25, 40 and 74 MeV, respectively. Semiclassical calculations, using relativistic electron wavefunctions and incorporating corrections for Coulemb deflection effects, are in very good agreement with the data. (Atomindex citation 11:497847)

CEA-CONF-4436 PC **A04**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Matrix Methods in Optical Model - Spherical Nuclei.
J Salvy. 1978, 60p
U.S. Sales Only.

The calculable R matrix theory developed by Lane and Robson by using the Bloch boundary condition operator L is shown to be useful in the frame of practical aspects of the optical model. The general formalism is recalled and applied to spherical nuclei. Practical methods are developed for constructing all the elements of the matrices which are to be inverted. A non local nuclear potential of the folding type is examined as a possible alternative or improvement of the conventional phenomenological Woods-Saxon potential. From a more fundamental point of view, matrix methods are also shown to be adapted to the treatment of Hartree-Fock type real parts. Finally the applicability of such matrix methods for practical evaluation purposes is illustrated with some simple examples. Other possibie developments are suggested. (Atomindex citation 11:498710)

CEA-N-2065 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Physique Theorique.
Renormalization Group and Deep Inelastic Scattering.
G. Mahoux. Nov 78, 60p CONF-7805200-1
In French.Rabat meeting on deep inelastic scattering, Bjorken scaling invariance and its nonconservation, Rabat, Morocco, 3 May 1978.
U.S. Sales Only.

These notes constitute an elementary introduction to the renormalization group, and its applications to deep inelastic scattering. They have four parts: 1) a brief account of the deep inelastic scattering, 2) the derivation for (phi) exp 4 theory, of the Callan-Symanzik equations; their use in studying the asymptotic behavior of Green function; the case of asymptotically free theories, 3) Wilson expansions of operator products, and the Callan-Symanzik equations that satisfy their coefficients, 4) the application of these ideas to deep inelastic scattering, the relation between the moments of the structure functions and Wilson coefficients, and the importance of asymptotically free theories for describing the strong interactions. (Atomindex citation 11:498532)

CENBG-7804 PC **A05**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Fission Barriers of 237 to 240 Plutonium Isotopes with the exp 236 U(alpha ,XN) Reactions.
These (3e Cycle),
J. P. Gireme. 1978, 92p
In French.
U.S. Sales Only.

Excitation functions for the reactions exp 236 U(alpha ,xn)sup(240-x)Pu have been measured for x=2, 3, 4. The production of exp 236 U targets as well as the chemical separation of Pu from the irradied targets are given. Experimental results have been analysed using the preequilibrium mechanism (PREEQ code) and the statistical model description of fission through a double humped barrier. (Atomindex citation 11:498796)

CENBG-7806 MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Radiative Capture of Fast Nucleons in the Mass Area of Medium and Heavy Nuclei.
F. Rigaud. 1978, 173p
In French.Thesis.
U.S. Sales Only. Microfiche copies only.

The cross sections for radiative capture of 14 MeV neutrons were investigated by the integration method for exp 59 Co, exp 93 Nb, exp 103 Rh, exp 133 Cs, exp 139 La, Ce and exp 159 Tb nuclei and by the activation method for exp 27 Al, exp 50 Ti, exp 51 V, exp 103 Rh, exp 127 I and exp 139 La nuclei. The gamma-ray spectra following the capture of 8-22 MeV protons on exp 110 Cd and exp 115 In nuclei were measured and the single-particle states capture cross-sections, deduced. The exp 110 Cd(p, gamma sub 0) exp 111 In angular distribution was also measured at 13 MeV. The direct and semi-direct processes explained the experimental results. The volume form of the coupling interaction was adequate to account for the neutron results, and the surface form, to account for the exp 110 Cd(p, gamma sub 0) exp 111 In results. The exp 110 Cd nuclei electric quadrupole excitation was found negligible compared with the electric dipole excitation, which is adequate to explain the exp 110 Cd(p, gamma sub 0) exp 111 In excitation function. (Atomindex citation 11:458850)

CONF-790976-3 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Chemistry.
Use of Systematics in the Interpretation of Nuclear Structure Far from the beta-Stable Region.
J. L. Wood. 1979, 12p
Contract W-7405-ENG-26
International symposium on future directions in studies of nuclei far from stability, Nashville, TN, USA, 10 Sep 1979.

The use of systematics in the interpretation of nuclear structure far from the beta-stable region is discussed. In particular, a set of rules for the use of systematics is presented together with some experimental criteria that need to be fulfilled for ra-

dioactive decay scheme studies in order that all states up to a given spin-parity and energy are located. Illustrative examples are taken from the region 180 < A < 210, with particular emphasis on the odd-mass Au and Hg nuclei. 6 figures. (ERA citation 05:024930)

CONF-7910148-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Excitation of Giant Resonances Via Charge Exchange Reactions.
C. D. Goodman. 1979, 14p
Contract W-7405-ENG-26
Giant multipole resonance topical conference, Oak Ridge, TN, USA, 15 Oct 1979.

Charge-exchange reactions can be useful for identifying isovector resonances. At present the most promising use of charge-exchange reactions with respect to giant resonances is to locate and study Gamow-Teller (GT) resonances. Detailed comparisons between GT and M1 strengths can yield further structure information. 7 figures. (ERA citation 05:024901)

CONF-791219-6 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Classical Dynamical Description of Heavy Ion Sequential Fission.
H. Kroeger. 1979, 8p
Contract W-7405-ENG-26
International symposium on Continuum Spectra of Heavy Ion Reactors, San Antonio, TX, USA, 3 Dec 1979.

Sequential fission processes are investigated in a classical fragmentation model. Dissipative forces are included. In the fissioning process the recoupling of excitational degrees of freedom to kinetic degrees of freedom is found important. 6 figures. (ERA citation 05:023292)

CONF-791219-7 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Signatures of Coulomb Fission: A Theoretical Study.
V. Oberacker, H. Kruse, W. T. Pinkston, and W. Greiner. 1979, 7p
Contract W-7405-ENG-26
International symposium on Continuum Spectra of Heavy Ion Reactors, San Antonio, TX, USA, 3 Dec 1979.

Evidence for Coulomb fission (CF) is noted first. Then the Hamiltonian is set down and explained, and an expression for the CF probability of CF is obtained. Results are summarized. Figures show the CF probability of exp 238 U as a function of projectile charge number and the excitation functions for CF of exp 238 U by exp 184 W and exp 136 Xe. 3 figures. (ERA citation 05:023275)

CONF-791243-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
ENSDF: Its Structure, Contents, and Use in Applied Research.
M. J. Martin. 1979, 10p
Contract W-7405-ENG-26
Japanese Nuclear Data Committee nuclear data workshop, Tokai-mura Ibaraki-ken, Japan, 10 Dec 1979.

A computer-based system for obtaining the energies and intensities of both nuclear and subsequent atomic radiations from radioactive nuclides in a format suitable for direct use by researchers in medical practice or research, health physics, industry, nuclear power, and environmental impact studies is discussed. The Evaluated Nuclear Structure Data File (ENSDF) consists of a set of evaluated data sets for each mass chain, including adopted level and decay schemes for each nuclide in that mass chain, and is prepared by the Nuclear Data Project at ORNL. The contents, organization, and status of ENSDF are described, along with its search and retrieval capabilities; both tabular listings and graphical displays may be produced. 3 figures. (ERA citation 05:024886)

CONF-800213-10 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Perspectives in the Theory of Nuclear Collective Motion.
A. Klein. 13 Mar 80, 29p
Contract EY-76-C-02-3017
Band structure and nuclear dynamics conference, New Orleans, LA, USA, 28 Feb 1980.

This report discusses three different subjects. The first is the development of a generalized version of the VMI (variable moment of inertia) model that ties it to the original form of the IBM (interacting boson model) and provides a possibility of fitting vibrational spectra with generalized vibrational formulas. The second is a suggestion for fitting band crossing calculations of the phenomenological type more completely than has hitherto been done into the framework of the VMI method. The third, which is the most important and far reaching, is the description f a complete mathematical method for the microscopic derivation of the IBM from a conventional shell-model Hamiltonian. In addition to elements already foreseen by previous authors, there is proposed a solution for the most important problem outstanding, not only within the framework of the IBM, but also in all previous work on boson expansion. This is the problem of actually selecting, in a general fashion, the most collective excitations. A criterion is introduced that the subspace constructed from these excitations should possess an average energy that is lower than the rest of the shell model space; the actual implementation of this criterion is explained. 8 tables, 62 references. (ERA citation 05:023294)

CONF-800540-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Search for Magnetic Dipole Strength and Giant Spin-Flip Resonances in Heavy Nuclei.
D. J. Horen. 1980, 27p
Contract W-7405-ENG-26
International symposium on highly excited states in nuclear reactions, Osaka, Japan, 12 May 1980.

A description is given of the use of high-resolution (n,n) scattering and the (p,n) reaction as tools to investigate highly excited states, with emphasis on information pertaining to magnetic dipole strength and giant spin-flip resonances in heavy nuclei. It is shown how the ability to determine uniquely the spins and parities of resonances observed in neutron scattering has been instrumental to an understanding of the distribution of M1 strength in exp 207 exp 208 Pb. Some recent results of (p,n) studies with intermediate energy protons are discussed. Energy systematics of the giant Gamow-Teller (GT) resonance as well as new delta l = delta S = 1 resonance with J/sup pi / = (1,2) exp - are presented. It is shown how the (p,n) reaction might be useful in locating M1 strength in heavy nuclei. 20 figures. (ERA citation 05:023273)

COO-3533-161 PC **A03**/MF **A01**
Syracuse Univ., NY.
Research Program in Elementary Particle Theory. Progress Report for Period Ending June 30, 1980.
1980, 42p
Contract EY-76-S-02-3533

The High Energy Theory Group at Syracuse conducted basic research in several areas of current interest. A great deal of progress was made in the understanding of systems with unusual topological properties. A variational formulation of the equations that govern spinning particles in general relativity was accomplished. Perturbative as well as nonperturbative properties (incorporated in an effective Lagrangian) of quantum chromodynamics aspects were investigated. The question concerning gauge fixing in non-Abelian gauge theories was studied. Several new phenomenological aspects of unified electroweak interactions were explored with the object of finding experimental tests for models other than the currently accepted Salam-Weinberg theory. A unified electroweak model based on the group (SU(2) x U(1)) x U'(1) was investigated to account for the repeated fermionic generations and to incorporate CP violations and explain the CP violation as well as the Cabibbo-like angles in terms of the quark masses. A unified theory for all interactions (with the exception of gravitational interactions) based on the group SU(5) x SU(5) was proposed. Finally, axially symmetric multi-instanton solutions were shown to be generated from a set of conformal mappings. The work performed is described briefly; references are given. (ERA citation 05:023225)

CRN-PN-78-25 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
High Spin States in exp 53 MN.
G. Guillaume, P. Fintz, A. Gallmann, F. Jundt, and I. Riedinger-Ordonez. 1978, 27p
In French.
U.S. Sales Only.

The exp 40 Ca(exp 16 O,3p gamma) exp 53 Mn reaction has been used at a beam energy of 45MeV to search for high-spin states in exp 53 Mn. By means of techniques of in-beam gamma -ray spectroscopy, the excitation functions, gamma - gamma coincidences, angular distributions, linear polarizations and simplified triple angular correlations were measured. A new decay scheme for high spin states is given. For the following levels (MeV), spin-parity assignments are deduced: 2.56, 13/2 exp - (confirmed); 3.44, 15/2 exp - ; 4.38, 17/2 exp - ; 5.61, 19/2 exp - ; 6.53, 21/2 exp - ; 7.00, 23/2 exp - . Mixing ratios are also reported. It is only with this spin sequence that the experimental populations of these states are well reproduced by compound nucleus evaporation calculations. High-spin states are successfully interpreted by including neutron excitations out of the f/sub 7/2/ shell. (Atomindex citation 11:501619)

DOE/ER/01545-274 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Physics.
Zero-Point Energy of Confined Fermions.
K. A. Milton. 1980, 23p
Contract AC02-76ER01545

A closed form for the reduced Green's function of massless fermions in the interior of a spherical bag is obtained. In terms of this Green's function, the corresponding zero-point or Casimir energy is computed. It is proposed that a resulting quadratic divergence can be absorbed by renormalizing a suitable parameter in the bag model (that is, absorbed by a contact term). The residual Casimir stress is attractive, but smaller than the repulsive Casimir stress of gluons in the model. The result for the total zero-point energy is in substantial disagreement with bag model phenomenological values. (ERA citation 05:024867)

DOE/ER/03069-770 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
Search for the Production of a New Quark Flavor at the Highest PETRA Energies.
D. P. Barber, U. Becker, H. Benda, A. Beohm, and J. G. Branson. 1980, 17p
Contract EY-76-C-02-3069

A study of hadron production in e exp + e exp - collisions at the highest PETRA energies reached so far is reported. Production of a new quark flavor was sought at cms energies of 33, 35, and 35.8 GeV. The measured values of the total cross section, the thrust distributions, and the study of inclusive muon production show no evidence for the production of a new charge 2/3e quark near threshold. In addition, during an energy scan zn the region 29.9 less than or equal to sqrt s less than or equal to 31.6 GeV, no hadron resonance indicting the existence of a bound state composed of charge 2/3e quarks was bound. 4 figures, 1 table. (ERA citation 05:024835)

EFI-349(7)-79 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Photoproton Production by 0.13 and 0.25 Gev Bremsstrahlung.
K. Sh. Egiyan. 1979, 19p
U.S. Sales Only.

The experimental data on inclusive photoproduction of protons on C exp 12 , Mg exp 24 , Cu exp 63 ,Sn exp 118 and Pb exp 208 nuclei irradiated by bremsstrahlung gamma -quanta at maximum energy 0.13 GeV and 0.25 GeV are given. Photoprotons were investigated in the angle regions 30 deg 90 deg and the momenta interval 0.24 <= p <= 0.48 GeV/c. The analysis of the energy spectra shows that if the invariant cross section is presented in the form of f approximately exp(-Bp exp 2), then the slope parameter B varies strongly with the energy variation of the gamma -quanta in the region up to 0.25 GeV and remains almost constant at variation of atomic number of the target-nucleus. The A dependence of the invariant cross

section is of particular interest. If presenting it in the form of f approximately Asup(n), then the exponent n jumps with the value from 0.6 to 1.15 at transition of Esub(gamma)sub(max) from 0.13 GeV to 0.25 GeV at similar angles and momenta of the detected protons. Such a jump in the value of n testifies to a great contribution in the cumulative proton photoproduction. (Atomindex citation 11:498599)

ETCA-78-R-060 MF **A01**
Etablissement Technique Central de l'Armement, Arcueil (France).
Design and Construction of a Sorting Device for the Associated Particle Experiment Carried out on the Van de Graaff by T(p,N) exp 3 He Reaction.
C. Becret. Feb 78, 61p
In French.
U.S. Sales Only. Microfiche copies only.

A speed filter type sorting device, used to separate helium particles emitted during the T(p,n) exp 3 He reaction from charged particles due to competitive or parasitic reactions, is described. (Atomindex citation 11:503004)

HU-TFT-78-23 MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Elastic pi N Partial Wave Analysis.
E. Pietarinen. Jun 78, 53p
U.S. Sales Only. Microfiche copies only.

Elastic pi N phase shifts have been determined from an energy independent dispersion relation constrained analysis covering the whole energy region. For this purpose separate fixed t, fixed c.m. angle and backward scattering analyses have been performed simultaneously and constrained together to produce a single solution. The fixed t amplitudes have been determined at 40 t values between 0 and -1.5 GeV exp 2 in such a way that they have the correct crossing and analyticity properties and fit all data from threshold to 200 GeV/c momenta. The fixed c.m. angle analysis was carried out at 18 evenly spaced cos THETAsub(cm) values using approximants which fit the data and have correct analyticity properties at each fixed angle. In the backward analysis analytic Csup((+-)) amplitudes were determined from the existing backward differential cross sections as well as pantip implies pi exp + pi exp - data in the crossed channel. Information of the pseudophysical pi pi implies NantiN amplitudes were also used. Finally the analyses were constrained together such that a single solution with all the mentioned analyticity properties was obtained. These analyses include all the available data until July 1977. (Atomindex citation 10:439672)

HU-TFT-78-33 MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Scale Violating Effects in Large Qsub(T) Muon Pair Production.
K. Kajantie, and J. Lindfors. 1978, 22p
U.S. Sales Only. Microfiche copies only.

The hard scattering and DDT approaches are compared to large qsub(T) and large M muon pair production, the former being valid at all qsub(T) but only to first order in alpha sub(S), the latter including a sum over all orders but being valid only for qsub(T) $<<$ M. The DDT formula is rederived in the common domain of applicability of the two approaches. A numerical study indicated that the higher order effects are important for comparison with experiment. (Atomindex citation 10:443366)

HU-TFT-78-38 MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Imaginary Components of T=1 Nucleon-Nucleon Phase Shifts and Their Effect on Spin-Dependent Inelastic Cross Sections.
A. M. Green, and M. E. Sainio. 1978, 19p
U.S. Sales Only. Microfiche copies only.

By means of a model involving the delta (1236), an improved set of imaginary components for the T=1 nucleon-nucleon phase shifts is obtained. These phase shifts are then used to calculate inelastic nucleon-nucleon cross sections below 720 MeV, including the spin-dependent inelastic cross sections delta epsilon/sub T//sup i/ and delta epsilon/sub L//sup i/. (Atomindex citation 10:475574)

HU-TFT-78-40 MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Neutral Current Couplings and SU(2)XU(1) Gauge Models.
M. Roos, and I. Liede. 1978, 20p
U.S. Sales Only. Microfiche copies only.

Combining neutral current (NC) data in a statistically correct way we determine (i) the weak NC couplings in neutrino-nucleon and -electron scattering independently of gauge models; (ii) the weak isospin T sub 3 of the right-handed fermions u/sub R/, d/sub R/ and e/sub R/ exp - , the Z mass, and sin exp 2 theta /sub W/ in SU(2)xU(1) models with standard left-handed fermion multiplet assignments and two Higgs doublets. Both determinations support the Weinberg-Salam model, although neither considerable right-handed fermion singlet-doublet mixing involving new heavy fermions nor the existence of a second Higgs doublet can be excluded. (Atomindex citation 10:475627)

HU-TFT-78-43 MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Meson Mass Spectrum and Unitarity.
N. A. Toernqvist. 1978, 44p
U.S. Sales Only. Microfiche copies only.

Using general arguments, we discuss corrections from unitarity and analyticity to the masses and mixings of the lowest qantiq states of the quark model. Although the input S wave states are nearly degenerate, apart from quark mass differences, the unitarized masses and mixing angles are close to the observed ones. (Atomindex citation 10:475634)

IFVE-OTF-78-111 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Omega exp - Hyperon Quadrupole Moment and a Possibility to Measure It.
S. P. Alliluyev, and S. S. Gershtein. 1978, 11p
U.S. Sales Only.

A possibility to determine the omega exp - hyperon spin, its magnetic and quadrupole moments is discussed. For this purpose the measurement of the fine structure of the omega exp - hyperonic atom levels by means of the crystal-diffraction method can be used. In this case the value of the omega exp - spin can be obtained from the number of the fine structure components. It is shown that the fine structure measurement of omega atoms gives unique information on the omega magnetic and electric quadrupole moments. (Atomindex citation 11:501308)

IFVE-OTF-79-31 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Bethe-Salpeter Models and Asymptotic Freedom.
K. G. Klimenko, and V. E. Rochev. 1979, 16p
U.S. Sales Only.

Possibilities for reconstruction of scaling in forward scattering amplitude models, based on solutions for the Bethe-Salpeter (BS) equation, are considered. For this purpose the method of renormalization group is applied: the solution for Callan-Sminanzik equation is iterated by an exact solution of the BS equation. Sufficient conditions for reconstruction of scaling in the asymptotically free field theories are obtained. A typical situation is illustrated by a ladder-type model of amplitude for the phi sub 63 field theory. (Atomindex citation 11:500601)

IFVE-OTF-79-71 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
General Solution of Relativistic One-Channel Inverse Scattering Problem.
S. N. Sokolov. 1979, 21p
U.S. Sales Only.

The kernels of the generators of unitary transformations are found explicitly in the p-representation. The generators transform the free Hamiltonian into the general solution of the one-channel inverse scattering problem in the absence of bound states. The transformation of the Hamiltonian adding to its spectrum the given set of bound states without changing the scattering operator is constructed. (Atomindex citation 11:500621)

IHZ-R-77-256 PC **A04**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 0.
G. Schumann, and R. Sube. Sep 77, 53p
In German.
U.S. Sales Only.

161 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are availabl on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503193)

IHZ-R-78-272 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 2.
G. Schumann, and R. Sube. Feb 79, 40p
In German.
U.S. Sales Only.

132 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503195)

IHZ-R-78-273 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 3.
G. Schumann, and R. Sube. Mar 79, 44p
In German.
U.S. Sales Only.

137 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503196)

IHZ-R-78-274 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 4.
G. Schumann, and R. Sube. Mar 79, 43p
In German.
U.S. Sales Only.

135 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503197)

IHZ-R-78-275 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 5.
G. Schumann, and R. Sube. Mar 79, 45p
In German.
U.S. Sales Only.

133 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI,

RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503198)

IHZ-R-78-276 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 6.
G. Schumann, and R. Sube. Mar 79, 48p
In German.
U.S. Sales Only.

135 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503199)

IHZ-R-79-278 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 8.
G. Schumann, and R. Sube. Mar 79, 49p
In German.
U.S. Sales Only.

141 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503201)

IHZ-R-79-279 PC **A03**/MF **A01**
Ingenieurhochschule Zittau (German D.R.).
Title List of Selected Soviet Reports in the Fields of Nuclear Research and Nuclear Engineering. 9.
G. Schumann, and R. Sube. Mar 79, 46p
In German.
U.S. Sales Only.

140 titles of reports issued by Soviet institutes (KFTI, EFI, IAE, IFVE, ITEF, NIIAR, NIIEFA, FEI, RI, SFTI) in the fields of nuclear research and nuclear engineering have been arranged according to the INIS subject scope. The reports are available on a loan basis from ZfK Rossendorf, Information Department, Dresden. (Atomindex citation 11:503202)

IPNO-RC-78-05 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Recent Developments in Heavy Ion Deep Inelastic Reactions.
M. Lefort, and C. Ngo. 1978, 63p
U.S. Sales Only.

This manuscript corresponds to four lectures at the Summer School of "Predeal" in Rumania (september 1978). In a first part, the present status of the main theoretical approaches of Deep Inelastic Reactions between Heavy Ions is described as follow: brief survey of the main characteristics of these reactions, the classical phenomenological equation of motion and the diffusion model and finally the unified theory for Energy Dissipation and Fluctuations. The second part deals with two aspects of experimental results which have been emphasized recently. 1) De-excitation of the fragments by light particle emission (neutrons, protons and alpha particles), 2) Experimental attempts in order to evaluate the transfer of angular momentum into intrinsic spin of the fragments. (Atomindex citation 11:498694)

IPNO-T-79-02 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
What Happens to the Energy Evaporated in the Very Inelastic Collisions. Analysis of the Emitted Neutrons in the Cu+Au System at 400MeV.
These (3e Cycle),
M. Morjean. 1979, 59p
In French.
U.S. Sales Only.

The neutron multiplicity in deep inelastic collisions has been measured for the system exp 63 Cu+ exp 197 Au at 400 MeV. The deep inelastic products were detected at two different angles (close to the grazing angle and 30 exp 0 forward it). Their masses were measured using a time-of-flight technique. The neutrons were detected in coincidence with the fragments. The efficiencies of the neutron detectors were measured relative to a exp 252 Cf source during beam time. Whithin an accuracy of 10%, all the emitted neutrons are evapored by the fully accelerated fragments. The excitation energy is shared between the fragments in proportion of their masses and the relaxation time for internal equilibration of the composite system is very short (10 exp -22 s.). (Atomindex citation 11:501641)

IPNO-TH-78-40 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Velocity Fields and Transition Densities in Nuclear Collective Modes.
S. Stringari. Oct 78, 41p
U.S. Sales Only.

The shape of the deformations occurring in nuclear collective modes is investigated by means of a microscopic approach. Analytical solutions of the equations of motion are obtained by using simplified nuclear potentials. It is found that the structure of the velocity field and of the transition density of low-lying modes is considerably different from the predictions of irrotational hydrodynamic models. The low-lying octupole state is studied in particular detail by using the Skyrme force. (Atomindex citation 11:498716)

IPNO-TH-78-48 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Microscopic Description of Nuclear Molecules, Application to the exp 12 C+ exp 12 C System.
J. Cugnon, H. Doubre, and H. Flocard. Dec 78, 46p
U.S. Sales Only.

The interaction energy between two oblate exp 12 C ions is calculated by means of the constrained Hartree-Fock method. The influence of the mutual orientation of the ions is investigated by considering two extreme configurations: an axial symmetric one where the two ions approach each other with their symmetry axes aligned with the collision axis and a triaxial one where the axes of the fragments are perpendicular to the collision line. The corresponding, potentials V sub 1 and V sub 2 display very distinct features. In particular the minima of the potentials occur for quite different interdistances. A method is devised for constructing from V sub 1 and V sub 2 the potentials and coupling factors between two ions rotating with definite angular momentum. Using these quantities in a coupled channel calculation, the gross features of the elastic, single 2 exp + inelastic and double inelastic cross sections are explained. The same calculation yields good agreement with the fusion data. (Atomindex citation 11:498662)

IPNO-TH-79-3 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Analysis of Heavy Ion Scattering Amplitudes.
C. Marty. Jan 79, 92p
U.S. Sales Only.

A heurisht method is derived for the analysis of light heavy ion systems. It consists in splitting an oscillatory amplitude into subamplitudes each of them being smooth, at least in modulus. Applications are given. (Atomindex citation 11:498701)

IPNO-TH-79-5 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Nuclear Densities from Self-Consistent Calculations.
M. Beiner, R. J. Lombard, J. P. Auger, and D. Mas. 1979, 2p
U.S. Sales Only.

No abstract available.

ISN-79-03 PC **A03**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Study of Neutron Hole States in exp 207 Pb, exp 206 Pb, exp 205 Pb Isotopes Via the (Exp 3 He, alpha) Reaction at 100 MeV.
J. Guiliot, J. Van de Wiele, H. Langevin-Joliot, E. Gerlic, and J. P. Didelez. Jan 79, 50p
U.S. Sales Only.

The exp 207 Pb, exp 206 Pb, exp 205 Pb neutron hole states were investigated up to 25 MeV excitation energy. New peaks, and bumps with additional fine structures are observed up to 10 MeV excitation energy. Levels (Ex, J, pi) and inner shell spectroscopic factors are deduced. (Atomindex citation 11:501621)

ISN-79-05 PC **A02**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
New Determination of Multipole Deformations of exp 238 U by Inelastic Scattering of 22MeV Protons.
Y. Brissaud, G. Berrier-Ronsin, J. Cameron, R. Frascaria, and J. Kalifa. Jan 79, 1p CONF-7903113-1
Conference on nuclear structure and elementary particle physics, Birmingham, UK, 28 Mar 1979.
U.S. Sales Only.

No abstract available.

ITEF-147(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Inclusive Spectra of Protons and Deuterons Emitted at 162 Deg under 2.2 6 and 8.5 GeV/C Proton Irradiation of Nuclei.
N. A. Burgov, M. K. Vlasov, and L. S. Vorob'ev. 1978, 12p
In Russian.
U.S. Sales Only.

Inclusive spectra of protons and deuterons emitted from nuclei at 162 deg (l.s.) at the incident proton momentum P sub 0 =2.2 GeV/c on C aand Pb nuclei, P sub 0 =6 GeV/c on Be, C, Cu and Pb nuclei and P sub 0 =8.5 GeV/c on C, Cu and Pb nuclei have been measured. The measurements were performed on the magnetic spectrometer ISTRA-2ITEPh. The invariant cross sections for both secondary protons and deuterons coincide at P sub 0 =6 and 8.5 GeV/c, while at P sub 0 =2.2 GeV/c they are 2-3 times less within the error bars of 5%. The spectra were approximated by the function f=Cxexp(-T/T sub 0) approximately equal to Cxexp(-Bp exp 2), where T and p stand for the emitted particle energy and momentum, respectively, and T sub 0 is the incident proton energy. The slope parameters do not depend on mass number of the target nucleus and are a bit higher than corresponding values available elsewhere for the case of pi exp - irradiation. (Atomindex citation 11:501597)

ITEP-95(1978) MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Structure of I=1 Reggeons Couplings with Baryons from Superconvergent Sum Rules.
A. A. Grigoryan, and A. B. Kaidalov. 1978, 42p
U.S. Sales Only. Microfiche copies only.

The superconvergent dispersion sum rules are applied to the processes alpha /sub i/N implies alpha /sub k/N and alpha /sub i/N implies alpha / sub k/ delta , where alpha /sub i/, alpha /sub k/ are boson reggeons with isospin I=1 (rho, A sub 2 , pi , A sub 1) and N, delta are N(938), delta (1232) respectively. The sum rules are saturated by the N and delta contributions. The system of equations for the helicity residues N alpha /sub j/N, N alpha /sub j/ delta , delta alpha /sub j/ delta is obtained. This system has a unique solution, which is in good agreement with experimental data. (Atomindex citation 11:501329)

JINR-E-15-11713 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Negative Pion Capture at Rest by Deformed Nuclei.
V. M. Abazov, V. S. Buttsev, and G. L. Buttseva. 1978, 23p

U.S. Sales Only.

The experimental results of investigation of the mechanism of negative pion capture at rest by deformed Ta, Lu, Tm, Er and Ho nuclei are presented. The Ho isotope yield has been determined by the activation method. The isomer ratios have been calculated for isotopes. The isobaric ratio for exp 159 Er and exp 159 Ho has been found to be I=(9.8+-2.9). The relation between the experimental value of the isobaric ratio and that of the amount of np- and pp-pairs on the nuclear surface has been established to be R=N/sub np//N/sub pp/=(4.4+-1.4) for exp 169 Tm. The results show that the excitation of the rotational nuclear motion is weakly dependent on the mass, charge and deformation of the initial nucleus, and it is a universal fact related to pion absorption on nucleon associations or clusters. (Atomindex citation 11:501573)

JINR-E-2-11983 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Asymptotic Behavior of Pion Electromagnetic Form Factor in QCD.
A. V. Efremov, and A. V. Radyushkin. 1978, 32p
U.S. Sales Only.

In the framework of the renormalizable quantum field theory a new approach is developed for the investigation of the asymptotic behavior of two-particle bound-state electromagnetic form factor. It is shown that the behavior of the pion EM form factor in quantum chromodynamics at sufficiently large momentum transfers is controlled by the short-distance dynamics only. The formula is obtained which expresses the asymptotic behavior of the pion form factor in terms of the fundamental constants of the theory. (Atomindex citation 11:501324)

JINR-E-2-12071 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
K/Sub L/sub 4/ Decay in the Chiral Quantum Field Theory.
D. Ebert, D. V. Kreopalov, and M. K. Volkov. 1978, 15p
U.S. Sales Only.

Form factors of K/sub l/sub 4/-decay are described in the framework of chiral quantum field theory. The axial form factors are calculated in the tree approximation which defines their main contribution. The vector form factor is calculated in the one-loop approximation. The results are in satisfactory agreement with the available experimental data. (Atomindex citation 11:501322)

JINR-E-2-12085 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Evaluation of Systematic Uncertainties Caused by Radiative Corrections in Experiments on Deep Inelastic nu /sub L/N-Scattering.
D. Yu. Bardin, and O. M. Fedorenko. 1979, 28p
U.S. Sales Only.

On the basis of the simple quark-parton model of strong interaction and on the Weinberg-Salam theory, compact formulae are derived for the radiative correction to the charged current-induced deep inelastic scattering of neutrinos on nucleons. The radiative correction is found to be around 20-30%, i.e., the value typical for deep inelastic lN scattering. The results obtained are rather different from the presently available estimations of the effect under consideration. (Atomindex citation 11:501315)

JINR-E-2-12476 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Decay Properties of Heavy Leptons in the Supersymmetric Model of Weak and Electromagnetic Interactions.
Ed. Egorian. 1979, 13p
U.S. Sales Only.

Decay properties of heavy leptons in the SU(2)xSU(2)xU(1) supersymmetric model of weak and electromagnetic interactions are studied. l anti nu /sub e/ nu leptonic and nu (nu /sup c/)h semihadronic decays, where l are leptons and h are hadrons, are considered. The partial and total decay rates and the production in p anti p collision of one of them are estimated for various values of its mass. (Atomindex citation 11:501325)

JINR-R-1-12115 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
"Particular" KNO Scaling in Hadron-Hadron and Hadron-Nuclear Interactions.
A. I. Anoshin, M. I. Solov'ev, D. Tuvdendorzh, M. Suleimanov, and V. V. Uzhinskii. 1979, 13p
In Russian.
U.S. Sales Only.

Automodel behavior of distributions in multiplicity of produced particles is studied as a function of the inelasticity coefficient in the pp (19.2 GeV/c), pi exp - p(N) and pi exp -12 C(40 GeV/c) interactions. The analog of the KNO scaling is shown to take place. The reasons for scaling breaking, which is shown to be mainly due to "leading" particles are discussed. (Atomindex citation 11:501310)

JINR-7-12313 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Possibilities of Production and Investigation of Properties of Light Neutron-Rich Nuclei in Transfer Reactions in the U-400 Cyclotron BEAMS.
A. G. Artyukh. 1979, 9p
In Russian.
U.S. Sales Only.

The nucleon stability and properties of very neutron-rich light nuclei are discussed. The yields of carbon and oxygen heavy isotopes in multinucleon transfer reactions are predicted on the basis of the Q/sub gg/ systematics. The possibilities of using the secondary beams of neutron-rich nuclei to synthesize the heavy isotopes of transfermium elements are proposed. (Atomindex citation 11:501584)

KFKI-1979-49 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Continuous Cut-off Method and the Relativistic Scattering of Spin-1/2 Particles.
T. Dolinszky. Jul 79, 15p
U.S. Sales Only.

A high energy formula, obtained in the framework of the continuous cut-off approach, is shown to improve the correctness of the standard phase shift expression for Dirac scattering by two orders of magnitude in energy. (Atomindex citation 11:501320)

KFKI-1979-50 MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Twistor Theory a Particle-Physicist Attitude.
Z. Perjes. Jul 79, 18p
U.S. Sales Only. Microfiche copies only.

Particle models in twistor theory are reviewed, starting with an introduction into the kinematical-twistor formalism which describes massive particles in Minkowski space-time. The internal transformations of constituent twistors are then discussed. The quantization rules available from a study of twistor scattering situations are used to construct quantum models of fundamental particles. The theory allows the introduction of an internal space with a Kaehlerian metric where hadron structure is described by "spherical" states of bound constituents. It is conjectured that the spectrum of successive families of hadrons might approach an accumulation point in energy. Above this threshold energy, the Kaehlerian analog of ionization could occur, wherein the zero-mass constituents (twistors) of the particle break free. (Atomindex citation 11:500618)

KMU-HEP-7802 MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Fragmentation of Quark and Diquark Jets.
E. M. Ilgenfritz, J. Kripfganz, and A. Schiller. Apr 78, 37p
U.S. Sales Only. Microfiche copies only.

The quark fragmentation model is extended to describe meson and baryon production from quark as well as diquark jets. The model is applied to e exp + e exp - inclusive annihilation and the current and target fragmentation region of deep inelastic scattering. An independent test of the model in lepton pair-triggered meson-nucleon reactions is proposed. The hadron distributions are predicted to depend on x = sqrt M exp 2 /s and x/sub F/ only via /sup x/F//sub 1-x/. (Atomindex citation 11:501339)

KMU-HEP-7807 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Canonical Formalism Applied to the Massive Schwinger Model.
R. Kirschner. 1978, 16p
U.S. Sales Only.

The application of the canonical formalism with constraints to gauge theories is discussed. The Poincare group generators of the massive Schwinger model with asymptotically bounded gauge fields are obtained in an appropriate gauge, eliminating all redundant degrees of freedom. The importance of the separation of a zero-mode degree of freedom from the gauge fields is demonstrated. (Atomindex citation 11:500600)

KMU-HEP-79-04 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Generalized Lipatov-Altarelli-Parisi Equations and Jet Caculus Rules.
R. Kirschner. 1979, 8p
U.S. Sales Only.

Within the leading logarithmic approximation of QCD using a method by Lipatov, we derive generalized Lipatov-Altarelli-Parisi equations for the m-parton distributions from which the jet calculus rules proposed recently by Konishi, Ukawa and Veneziano can be obtained. (Atomindex citation 11:501347)

LA-UR-80-1020 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Non-Adiabatic Mass Parameters.
G. Schuette. 1980, 4p CONF-800363-1
Contract W-7405-ENG-36
Workshop on nuclear dynamics, Granlibakken, CA, USA, Mar 1980.

A fissioning nucleus is described by a Hamiltonian consisting of the kinetic energy, a single-particle potential, and a pairing force. The solution of the time-dependent Schroedinger equation is obtained for a nucleus starting in the BCS ground state. (ERA citation 05:023293)

LA-UR-80-1259 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Nuclear Properties of Mendelevium.
D. C. Hoffman. 1980, 13p CONF-800362-1
Contract W-7405-ENG-36
25. anniversary of the discovery of mendelevium meeting, Berkeley, CA, USA, 28 Mar 1980.

The heavy Fm isotopes (exp 258 Fm and exp 259 Fm) so far appear to be unique in exhibiting very symmetric mass distributions and anomolously high fragment total kinetic energies. This effect appears to be associated with the Z = 100 proton configuration of the fissioning nuclide which can fission symmetrically into two fragments having the Z = 50 closed-proton shell configuration; exp 256 Cf which has the same number of neutrons but only 98 protons does not exhibit these fission properties. Furthermore, exp 259 Md, also having 158 neutrons but with 101 protons, fissions symmetrically but with a normal total kinetic energy. However, the total kinetic-energy distribution is extremely broad, indicating a range of fragment shapes at scission from spherical to highly distorted. It is extremely important to check more nuclides with Z greater than 100 and N greater than or equal to 158 to check the relative importance of the fragement proton and neutron shells. New methods are needed for measurements of half lives of ms or less and for providing positive identification of the Z and A of the fissioning species. Recent experiments indicate that exp 259 Fm is produced with a 10 to 15 nb cross section in bombardments of exp 248 Cm with exp 18 O and that therefore extreme caution must be exercised in

making assignments. However, transfer or deep inelastic reactions of this kind would appear to offer a good possibility for making the heavier isotopes of Md or Lr for study by bombarding Bk or Es targets with exp 18 O. (ERA citation 05:023276)

LA-UR-80-1266 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Charge Conjugation and Its Violation in Unified Models.
R. Slansky. Apr 80, 16p CONF-800469-1
Contract W-7405-ENG-36
Workshop on grand unification, Durham, NH, USA, 10 Apr 1980.

Yang-Mills theories admitting a charge conjugation, C, which reflects the representation of left-handed fermions f/sub L/ onto themselves, are reviewed with particular attention to flavor chiral theories, where f/sub L/ is non-self-conjugate. Simple cases of the fermion mass matrices in SO sub 10 and E sub 6 are studied, and it is observed that the weak isospin (I/sup w/)-conserving part of the mass can be classified into its C-conserving and C-violating pieces. If the left-handed fermions are assigned to families of 16's of SO sub 10 or 27's of E sub 6 , then the hypothesis that the I/sup w/ invariant mass violates C maximally, with the C-conserving part put to zero, gives a simple explanation of the low-mass 5-bar + 10 bar structure of the families. (ERA citation 05:023249)

LBL-10645 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Phenomena at Very High Spins.
F. S. Stephens. Mar 80, 14p CONF-800213-11
Contract W-7405-ENG-48
Band structure and nuclear dynamics conference, New Orleans, LA, USA, 28 Feb 1980.
Microfiche copies only.

The present talk has three parts: first, a discussion of current ideas about the physics of very high spin states; second, some comments about noncollective behavior up to the highest spins where it is known, approx. 40 h; and finally, a presentation of the newest method for studying collective behavior up to spins of 60 to 70 h. The intention is that the overview presented in the first part will be sufficiently broad to indicate the relationship of the noncollective and collective behavior discussed in the other parts, and to provide some understanding of the compromise in behavior that seems to occur at the very highest spins. 13 figures. (ERA citation 05:024939)

LPNHEP-78-7 PC **A03**/MF **A01**
Paris-6 Univ. (France). Lab. de Physique Nucleaire et de Hautes Energies.
Differential and Channel Cross Sections for the Reactions K exp 0 sub(L)P Implies K exp 0 sub(S)P and K exp 0 sub(L)P Implies lambda exp 0 pi exp + in the CM Energy Range 1605 to 1910MeV.
M. J. Corden, G. F. Cox, D. P. Kelsey, C. A. Lawrence, and P. M. Watkins. 1978, 35p
U.S. Sales Only.

The differential and channel cross sections have been measured for the reactions K exp 0 sub(L)p implies K exp 0 sub(S)p and K exp 0 sub(L)p implies lambda exp 0 pi exp + in nine energy intervals in the center of mass range 1605 to 1910 MeV. The regeneration reaction is a combination of the KN amplitudes (with I=0 and 1) and the anti-KN amplitude (I=1) and is very sensitive to the various KN phase shift solutions, some of which show an exotic I=0 P sub 1 -resonance. The results have been expressed in terms of frequency distributions and cross sections, normalised by the lambda exp 0 pi exp + reaction. These results have been compared with the predictions of various partial wave analyses. Qualitatively one can eliminate the P sub 1 -nonresonant solution though no solution correctly predicts the results. (Atomindex citation 11:498593)

LSNN-78-03 PC **A03**/MF **A01**
Nantes Univ. (France). Lab. de Spectroscopie Nucleaire.
Study of exp 72 Ge, exp 74 Ge, exp 76 Ge by the (T,p) Reaction.
C. Lebrun, F. Guilbault, D. Ardouin, E. R. Flynn, and D. L. Hanson. 1978, 32p
U.S. Sales Only.

A systematic study of all of the stable even germanium isotopes by the (t,p) reaction has been performed. The reaction protons were analyzed in a Q3D spectrometer with a resulting energy resolution approximately 15 keV. Levels up to 3 MeV in excitation energy were measured and the angular distributions, compared to distorted-wave analysis. A number of new spin assignments are made in the heavier germanium nuclei. Examination of the systematic trend of the ground state as well as various excited levels strongly supports a transition in nuclear deformation between N=40 and N=42. The data also indicate the effects of the approaching shell closure at N=50. (Atomindex citation 11:501636)

LSNN-78-05 PC **A02**/MF **A01**
Nantes Univ. (France). Lab. de Spectroscopie Nucleaire.
Exp 28 P Spectroscopy by the (Exp 3 He,T) Reaction.
B. Ramstein, L. H. Rosier, and C. Jeanperrin. 1978, 22p
In French.
U.S. Sales Only.

The energy levels of exp 28 P were studied with the exp 28 Si(tau,t) exp 28 P reaction at a bombarding energy of 35 MeV and 15 keV resolution (FWHM). Excitation energies were measured for 30 separated levels or multiplets with a precision of approximately 5 keV up to 3.911 MeV and approximately 10 keV up to 5.19 MeV (21 of these levels were precisely determined for the first time). Spectroscopic information was derived for 22 levels on the basis of the transfered-L shape analogy of their experimental angular distributions. Comparison was made with DWBA calculations. Some previous J/sup pi / ambiguities are now removed and we propose spectroscopic assignments up to 3.91 MeV. Odd-parity levels appear above 3.2 MeV. Comparison was made with the other components of the A=28, in particular with the mirror nucleus exp 28 Al. (Atomindex citation 11:501655)

LYCEN-7840 PC **A04**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Study of Polarization in Transfer Reactions Induced by Heavy Ions.
These (D. es S.),
R. Nahabetian. 1978, 65p
In French.
U.S. Sales Only.

The polarization in heavy ion-induced reactions is studied. The formalism used is the D.W.B.A. One nucleon transfer reaction transition matrix is calculated exactly. The use of an expansion in spherical Bessel function bases allows one to take into account some properties in a multiple regression model. The elastic scattering of exp 6 Li polarized on exp 12 C, exp 16 O and exp 28 Si at 20 MeV and 22.8 MeV, exp 12 C(exp 6 Li,alpha) exp 14 N at 20 MeV for different transitions in exp 14 N, and exp 12 C(exp 6 Li,d) exp 16 O at 20 MeV for different transitions in exp 16 O are used to shown the polarization selectivity in the alpha -d relative wave function in exp 6 Li and in nucleus-nucleus potentials obtained from the optical model of elastic scattering. (Atomindex citation 11:501643)

LYCEN-7910 PC **A03**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Talmi and Talmi and Moshinsky Coefficients in the Harmonic Oscillator Basis.
M. Hage Hassan. 1979, 26p
In French.
U.S. Sales Only.

A new generating function for the harmonic oscillator spherical basis is constructed from the Laguerre polynomials and spherical harmonics generating functions. Recurrence relations of interest for calculating the Talmi coefficients are discussed. A new expression for the Talmi-Moshinsky coefficients is presented. New relations which are useful from a practical point of view between Talmi-Moshinsky coefficients are established. (Atomindex citation 11:500591)

LYCEN-7913 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
In-Beam Spectroscopy of the Odd-Odd exp 108 IN Nucleus.
R. Duffait, R. Beraud, and A. Charvet. 1979, 2p
U.S. Sales Only.

No abstract available.

NBI-HE-79-13 MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Fermionic Green's Function and Fermionic Determinant in Massless QCD sub 2.
H. Arodz. 1979, 27p
U.S. Sales Only. Microfiche copies only.

Exact fermionic Green's function in massless QCD sub 2 is obtained by introducing generalized gauge transformations. An explicit, compact expression for the causal fermionic Green's function is given provided that the gauge potentials satisfy certain conditions. The functional determinant arising from functional integration over the fermionic fields is calculated. The results are expressed in terms of path ordered exponentials. (Atomindex citation 11:500558)

N80-27165/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Interaction of the Intermediate Energy Neutrino with Nuclei.
E. V. Bugayev, M. A. Rudzskiy, G. S. Bisnovatyy-kogan, and Z. F. Seidov. Jun 80, 48p NASA-TM-76242
Contract NASW-3198
Transl. Into English of "Vzaimodeystviye Neytrino Srednykh Energiy S Yadrami" Rept. Pr-403 Acad. Of Sci. USSR, Inst. Of Space Research, Moscow, 1977 p 1-49. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The interaction of the electronic neutrino with nuclei C-12, O-16, Ci-37, Fe-56, Ga-71, and Br81 is considered for neutrino energy up to 300 MeV. The nuclei are described by single-particle shell-model with Woods-Saxon potential. The parameters of the potential are specially chosen for each nuclei in order to describe correctly the upper occupied single particle levels of the nuclei. The cross sections for inelastic and elastic interactions of neutrino with nuclei are calculated within this model, taking into account charged and neutral current of weak interaction. The neutral currents are described by Weinberg theory. The results of the cross section calculations are presented and the comparisons with the results of the other authors are given. The possibilities of improvement of the exactness of obtained results are discussed. Some details of the calculations are included.

N80-27184/4 PC **A03**/MF **A01**
Nantes Univ. (France). Lab. de Spectroscopie Nucleaire.
Classical Studies of the Ellipsoidal Shapes for Dynamical Deformation Theories of the Nucleus.
B. Remaud. 1979, 36p LSNN-78-04

The shape dependent functions of the liquid drop and the droplet models are analytically calculated for an ellipsoid. Using the ellipsoidal symmetries, these functions (including the curvature function) are written in terms of three basic expressions. The nuclear deformation energy can be calculated in a simple way for axially symmetric and asymmetric ellipsoidal nuclei whatever the magnitude of the deformation.

ORNL/TM-7042 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Consistent Nuclear Model for Compound and Precompound Reactions with Conservation of Angular Momentum.
C. Y. Fu. May 80, 46p
Contract W-7405-ENG-26

The exciton model of precompound reactions is modified such that it automatically reduces to the usual evaporation formula after equilibrium has been reached. The result is further modified to conserve angular momentum in a form compatible with the Hauser-Feshbach formula. Such modification allows a consistent description of intermediate

excitations from which tertiary reaction cross sections can be calculated for transitions to discrete residual levels with known spins and parities. Level densities used for the compound component of reaction cross sections are derived from direct summation of the particle-hole state densities used for the precompound component. Predicted neutron, proton, and alpha-particle production cross sections and spectra from 14-MeV neutron-induced reactions are compared with experimental data. Model parameters of general validity are fixed beforehand. Two parameters are determined from calculations for exp 56 Fe and then used with reasonable success for predicting cross sections for twelve other nuclides. 17 figures. (ERA citation 05:023295)

RI-101 PC **A02**/MF **A01**
Radievyi Inst., Leningrad (USSR).
Angular Correlations of Slow Particles in Nuclear Disintegrations at High Energies.
V. G. Bogdanov, V. A. Plyushchev, and Z. I. Solov'eva. 1979, 13p
In Russian.
U.S. Sales Only.

Two-particle angular correlations of slow charged particles in disintegrations caused by deuterons and alpha -particles with the momentum of 5 GeV/c per nucleon have been studied by the nuclear photoemulsion technique. Experimental data consisted of 553 d-A and 503 alpha -A events chosen by tracks without any separation over multiplicities. In the range of small relative angles for particles with the range ratio R/R'=1.0+-0.1 there has been observed a nearly twofold excess of the number of pairs of particles above the background this fact testifying to a likely regular character of the findings. Unambiguous identification of correlated secondary slow particle pairs using their ranges and angular characteristics demands a sufficiently broader statistical data base. (Atomindex citation 11:501592)

RL-79-054 PC **A03**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Baryoniums - the S-Matrix Approach.
D. P. Roy. Aug 79, 49p
U.S. Sales Only.

In this series of lectures the question of how the baryoniums are related to charmoniums and strangoniums is discussed and it is pointed out that in the S-matrix framework, they all follow from the same pair of hypotheses, duality and no exotics. Invoking no underlying quark structure, except that inherent in the assumption of no exotics, it is shown that there are no mesons outside the singlet and octet representation of SU(3) and no baryons outside the singlet, octet and decaplet. In other words all mesons occur within the quantum number of a q-antiq system and all baryons within those of qqq. This seems to be an experimental fact, which has no natural explanation within the S-matrix framework except that it is the minimal non-zero solution to the duality constraints. The approach in the past has been to take it as an experimental input and build up a phenomenological S-matrix framework. Lately it has been realised that the answer may come from the colour dynamics of quarks. If true this would provide an important link between the fundamental but invisible field theory of quarks and gluons and the phenomenological but visible S-matrix theory overlying it. The subject is discussed under the headings; strangonium and charmonium, baryonium, spectroscopy, baryonium resonances, FESR constraint, baryonium exchange, phenomenological estimate of omega - baryonium mixing at t = 0, and models of omega - baryonium mixing. (Atomindex citation 11:498556)

RL-79-066 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Instantons and the 1/N Expansion.
M. J. Teper. Sep 79, 11p
U.S. Sales Only.

It is shown that a non-interacting gas of instantons, gives a contribution which vanishes, in QCD, exponentially with N (the number of colours). If some of the interactions between instantons are included then the resulting dilute gas of instantons - which is now in the form that is used in practice to investigate the structure of hadrons - gives a contribution that is essentially constant with N. Thus it is entirely consistent for both the N implies infinity limit to be useful and for the dilute gas of instantons to be relevant for the properties of hadrons. (Atomindex citation 11:498569)

RL-79-067 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
QCD Perturbation Theory for Confined Quarks and Gluons. 1.
F. E. Close, and R. R. Horgan. Sep 79, 24p
U.S. Sales Only.

QCD perturbation theory in a (spherical) hadron, as formulated by Lee (Phys. Rev.; D19: 1802 (1979)), is discussed and extended. The consistency of the formalism is illustrated by verifying that it yields the same numerical results for one gluon exchange energy shifts as have been previously obtained semi-classically in the MIT bag. Phenomenological consequences of this are discussed. The application of the perturbative approach to calculating the glue content of the proton is briefly illustrated. (Atomindex citation 11:498483)

RL-79-068 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Reaction pi exp - p implies K exp 0 sigma exp 0 Up to 2375 MeV/C.
J. C. Hart, R. D. Baker, and K. W. Bell. Sep 79, 13p
U.S. Sales Only.

Differential cross-section and polarisation measurements for the reaction pi exp 0 p implies k exp 0 sigma exp 0 are presented from 1395 to 2375 MeV/c incident beam momentum. The polarisation data from an earlier experiment, from threshold to 1334 MeV/c have been re-analysed by an improved method leading to a substantial reduction in the errors. (Atomindex citation 11:498604)

UCRL-50400(V.17)(Pt.C) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Program RECENT (Version 79-1): Reconstruction of Energy-Dependent Neutron Cross Sections from Resonance Parameters in the ENDF/B Format.
D. E. Cullen. 31 Oct 79, 39p
Contract W-7405-ENG-48

Program RECENT reconstructs energy-dependent neutron total, elastic, capture, and fission cross sections from a combination of resonance parameters and tabulated background cross sections in the ENDF/B format. Entire evaluations, not just cross sections, are written to the result file, which is in ENDF/B format. The output includes the original resonance parameters in a form that can be used in Doppler broadening and self-shielding calculations. A listing of the source deck is available on request. 5 figures, 5 tables. (ERA citation 05:023257)

UCRL-84370 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Prediction of Heavy Element Fission Barrier Features for Multiple Chance Neutron Cross-Section Calculations.
R. Y. Cusson, W. M. Howard, H. M. Meldner, and P. Moeller. 1980, 9p CONF-800551-1
Contract W-7405-ENG-48
Symposium on neutron cross sections from 10 - 50 MeV, Upton, NY, USA, 12 May 1980.

A state-of-the-art calculation of even, odd, and even-odd heavy neutron-rich element fission barriers and neutron binding energies is described. The range 76 less than or equal to Z less than or equal to 100, 118 less than or equal to N less than or equal to 184 is selected for application to ICF burnup. Some techniques for exploring multidimensional parameter spaces on the computer are discussed. Contour maps of fission barriers and neutron binding energies are shown. 3 figures. (ERA citation 05:024927)

UTTAC-13 PC **A03**/MF **A01**
Tsukuba Univ., Ibaraki (Japan). Tandem Accelerator Center.

Exp 12 C + exp 12 C + alpha Three-Body Final State Induced by the exp 12 C + exp 16 O Entrance Channel.
K. Furuno, K. Katori, T. Aoki, T. Ooi, and J. Sanada. 1979, 39p
U.S. Sales Only.

A kinematically-complete experiment has been made of the exp 12 C + exp 16 O implies exp 12 C + exp 12 C + alpha reaction in the range of bombarding energies between 68 and 80 MeV. The double cross section was measured by observing two exp 12 C nuclei in the time coincidence mode at 30 exp 0 with respect to the beam in a symmetrical coplaner geometry. It is clarified that the reaction mainly proceeds through sequential decay involving the formation of the 4 exp + 10.35- and 6 exp + 14.82- MeV states of exp 16 O. The double cross section for these sequential decays exhibits a marked enhancement at 70 MeV superposed on a large continuous background. In a Hauser-Feshbach analysis, the continuous background of the differential and double cross sections is successfully reproduced for the 4 exp + 10.35-MeV state of exp 16 O. The exp 12 C- exp 12 C angular correlation measured at 77 MeV shows a significant discrepancy between the experimental data and the Hauser-Feshbach prediction. (Atomindex citation 11:501614)

WIS-Ph-79/44 PC **A03**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
Even-Even Neutron Rich Isotopes.
E. Cheifetz, H. A. Selic, A. Wolf, R. Chechik, and J. B. Wilhelmy. 1979, 33p
U.S. Sales Only.

Nuclear spectroscopy of even-even fission products is discussed in view of available data and techniques with emphasis on the capabilities of studying the prompt de-excitation spectra. Sources of fission products and their expected yields are evaluated with respect to neutron richness. Experimental methods and specific experiments of detecting radiations from unseparated fission products for assignments of levels, lifetime measurements, and measurements based on the initial alignment of the fragments are described. Some preliminary results from an experiment with a source of exp 254 Cf are given. The above results are incorporated with results from detailed studies following beta decays to give a general picture of the region of transition nuclei leading to deformations in the rare earth and the onset of deformation in the Zr-Mo-Ru fission products. (Atomindex citation 11:501598)

20I. Plasma Physics

AD-A086 018/9 PC **A03**/MF **A01**
Joint Inst for Lab Astrophysics Boulder CO
Electron Conductivity in Combustion Plasmas.
Final rept. Oct 77-Oct 79,
L. C. Pitchford, and E. C. Beaty. Mar 80, 41p
AFWAL-TR-80-2019
Contract MIPR-FY1455-79-00609

The major uncertainty in the calculation of the conductivity in certain plasmas representative of those produced as combustion products in MHD generators is due to the uncertainty in the low energy momentum transfer cross sections for electron scattering in water vapor. The most reliable values of such low energy cross sections are those deduced from electron swarm experiments. The determination of cross sections from swarm experiments involves solving the Boltzmann equation for the electron energy distribution function using some assumed trial set of cross sections. Certain integrals of the distribution function yield the quantities measured in swarm experiments, such as drift velocities and diffusion coefficients. By comparing the calculated values of these measurable quantities with those found experimentally, it is possible to reach useful conclusions about the trial set of cross sections. An iterative procedure can then allow deduction of a set of cross sections which is consistent with swarm observations. The low energy cross sections are thus determined and are some of the most reliable available.

BUM-63 PC **A03**/MF **A01**
Bergen Univ. (Norway). Dept. of Applied Mathematics.

Corrections to Classical Kinetic and Transport Theory for a Two-Temparature, Fully Ionized Plasma in Electromagnetic Fields.
A. H. Oeien. Jun 77, 30p
U.S. Sales Only.

Sets of lower order and higher order kinetic and macroscopic equations are developed for a plasma where collisions are important but electrons and ions are allowed to have different temperatures when transports, due to gradients and fields, set in. Solving the lower order kinetic equations and taking appropriate velocity moments we show that usual classical transports emerge. From the higher order kinetic equations special notice is taken of some new correction terms to the classical transports. These corrections are linear in gradients and fields, some of which are found in a two-temperature state only. (Atomindex citation 11:498079)

CLM-R-166 PC **A03**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Computation of Multiple MHD Equilibria in Axisymmetric and Straight Geometry.
C. U. Thomas. Jan 79, 38p
U.S. Sales Only.

The details of the numerical methods used in codes for computing MHD equilibria in discrete conductor configurations are described with both code users and code writers in mind. Results produced by the codes have been successfully verified against analytic results and independent computations. The axisymmetric code has proved to be a valuable diagnostic aid for the TOSCA experiment. The user images of the codes are described in the appendices. (Atomindex citation 11:501088)

CONF-791135-12 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Design of a Spatially Resolved T/sub I/ Diagnostic System for EBT-S.
J. C. Glowienka. 1979, 16p
Contract W-7405-ENG-26
21. annual meeting of the American Physical Society, Boston, MA, USA, 12 Nov 1979.

A diagnostic neutral beam system is being designed to provide spatially resolved measurements of T/sub I/ on EBT-S. This installation will be the first step toward testing neutral beam heating in an EBT geometry and must be designed to be compatible with the intense microwave environment (isolation) and with the steady-state nature of EBT (particle control). The beam system will inject an intense (approx. .300 mA/cm exp 2) monoenergetic neutral beam (approx. .5 cm diam) perpendicular to the lines of sight of an existing four-channel charge exchange neutral analyzer. The resolution volume, defined as the intersection volume of beam and detector-line-of-sight will be approx. 1 cm exp 3 . The beam source will be a 20 kV single aperture reflex arc (SARA) source. The system is being designed to operate either steady state or chopped at 50% duty cycle for long-time synchronous detection. Design criteria for selection of source parameters and anticipated results will be discussed. (ERA citation 05:023323)

CONF-800138-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of a High Power Submillimeter Pulsed Laser System.
K. L. Vander Sluis, D. P. Hutchinson, and P. A. Staats. 1980, 7p
Contract W-7405-ENG-26
Japan/US workshop on far-infrared diagnostics, Boston, MA, USA, 28 Jan 1980.

This report describes the selection, development, and testing of the system components and presents the power and frequency profiles achieved in tests made on the assembled system. These results, and knowledge gained through design and development work, have suggested improvements in design characteristics to be applied to future research on this diagnostic method. (ERA citation 05:024993)

DOE/ET/53051-2 PC **A03**/MF **A01**
Wisconsin Univ.-Madison.
Stability Analysis of Cylindrical Vlasov Equilibria.
R. W. Short. Feb 80, 39p
Contract AS02-76ET53051

A method is presented for the fully kinetic, nonlocal stability analysis of cylindrically symmetric equilibria. Applications to the lower hybrid drift instability and the modes associated with a finite-width relativistic E-layer are discussed. (ERA citation 05:023336)

DOE/ET/53051-3 PC **A03**/MF **A01**
Wisconsin Univ.-Madison.
Non-Ambipolar Transport in a Magnetic Divertor.
C. M. Strawitch, and G. A. Emmert. Feb 80, 36p
Contract AS02-76ET53051

Plasma transport is studied in a simulated magnetic divertor in the Wisconsin single ring DC machine. The transport perpendicular and parallel to the magnetic field is shown to be non-ambipolar by a variety of measurements, but can be forced to be ambipolar by an appropriately designed divertor target plate. The density profile in the scrape-off zone agrees with the predictions of a one-dimensional diffusion equation that assumes classical cross-field transport and plasma flow parallel to the field at the local ion acoustic velocity. (ERA citation 05:023329)

EUR-CEA-FC-991 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Parametric Instabilities in Large Plasmas.
M. Brambilla, and B. Liberman. Jan 79, 39p
U.S. Sales Only.

Parametric decay processes in large plasmas are considered as the linear stage of a three wave interaction (pump, sideband and beat wave) in which the amplitude of the externally excited pump is sufficiently large to neglect pump depletion to first order, yet sufficiently small to allow a linearized treatment of the pump propagation to zeroth order. The coupling coefficients are then obtained from an iterative solution of Vlasov equation, and a compact expression is derived, in which the multiple series over Bessel functions is explicitly summed. Even in the limit of a very long wavelength pump, the dispersion relation obtained in this way does not coincide with the one obtained using the well-known "dipole" approximation, unless both the sideband and beat wave are resonant modes of the plasma. An analysis of the origin of this discrepancy allows us to conclude that "quasimodes" (evanescent waves driven absolutely unstable by the pump) are more correctly described by the iterative approach. (Atomindex citation 11:497975)

EUR-CEA-FC-993 PC **A04**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Equilibrium and Stability of a Toroidal Plasma inside its Vessel.
M. Cotsaftis. Feb 79, 60p
In French.
U.S. Sales Only.

The problem of the evolution and the behavior of a plasma inside its vessel in interaction with the exterior circuits has been analyzed. In order to study the effect of the deformation of the plasma cross section which is experimentally observed, the equilibrium of the plasma, from which "inner" parameters can be determined in terms of the "outer" given ones, is first developped to all orders in the small parameter epsilon = a/R << 1, through it appears that higher order terms in epsilon exp 3 and above are unimportant unless specific cases. There, the equilibrium parameters are given to 0(epsilon exp 2). (Atomindex citation 11:497991)

IAE-3098 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Energy Transfer in a Collisionless Plasma.
Yu. V. Medvedev. 1979, 27p
In Russian.
U.S. Sales Only.

Energy transfer of the decay of electron temperature break in a collisionless plasma was investigated by the numerical simulation method to study energy transfer processes in a laser plasma, electron heat conduction in particular. Spatial, time and temperature dependences were considered for energy flux. Energy flux transferred out from a region with heated electrons to the neighbouring region with cold electrons is shown not to achieve free-molecular boundary at the absence of external energy sources in a collisionless plasma. The flux is maximum at the point of initial temperature break, it is proportional to the temperature of hot electrons in the degree 3/2, and it is about twofold smaller than the flux into vacuum. There is a substantial dependence of the flux on the coordinate which is symmetrical in relation to the point of initial temperature break, time dependence being weaker. The backcurrent of cold electrons to the region previously occupied by hot electrons is observed at the numerical experiment along with a characteristic reduction and subsequent increase near the point of X=0 of electron density undergoing fluctuations. The ions are shown to be carried away by electrons. (Atomindex citation 11:501061)

IAE-3112 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Suppression of Drift-Cone Plasma Instability in Adiabatic Traps by Means of Electron Heating.
A. B. Mihailovskii. 1979, 11p
In Russian.
U.S. Sales Only.

Theoretically studied is plasma drift-cone instability suppression in adiabatic traps by electron heating. Ion pressure is supposed to exceed local value of magnetic field pressure, beta sub(i)>1. It is shown, that a drift-cone instability is suppressed in that case, if the electron pressure also exceeds the magnetic field pressure, beta sub(e)>1. (Atomindex citation 11:501065)

INIS-mf-5394 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Plasma Physics Research Group Annual Progress Report.
Dec 78, 19p
U.S. Sales Only.

During 1978, work continued on the effects of plasma non-uniformities on magnetoacoustic oscillations in current-carrying plasmas. Work on the linear diffusion pinch programme was primarily devoted to the completion of two experimental devices: FUZA-2 and FUZA-3. The results of the first series of experiments on these devices are described. In addition, some theoretical work on diffusion in cylindrical and toroidal plasmas is described. (Atomindex citation 11:498010)

IPPJ-364 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Formation of Convective Cells by Modulational Instability of Drift Alfven Waves.
J. Weiland, and H. Sanuki. Jan 79, 14p
U.S. Sales Only.

A model equation describing drift Alfven wave with E x B nonlinearity is derived. For a special ordering a nonlinear Schroedinger equation is derived, which governs modulational instability of the drift Alfven wave. Translational invariance is assumed along the magnetic field. The relation between the characteristic scale lengths parallel and perpendicular to the drift flow for the onset of cell formation is found to depend on if the wave propagates parallel or antiparallel to the drift flow and on the sign of the wave energy. The influence of perpendicular ion viscocity is also discussed. (Atomindex citation 11:501094)

IPPJ-367 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Propagation of Ion Acoustic Cnoidal Wave.
K. Konno, T. Mitsuhashi, and Y. H. Ichikawa. 1979, 22p
U.S. Sales Only.

Higher order contributions in the reductive perturbation theory have been reexamined for the nonlinear ion acoustic wave propagation under the periodic boundary condition. The boundary condition gives rise to renormalization terms which enable

us to eliminate secular contribution in the higher order terms. As a result of analysis carried upt to the second order, the ion flux associated with propagation of nonlinear ion acoustic cnoidal wave is examined for various values of excitation frequencies. It has been shown explicitly that the dependence of the ion flux on the wave amplitude becomes much weaker than that of quasi-linear theory at lower frequency. This illustrates that the averaged properties such as the averaged flux in genuine nonlinear systems depend on their nonlinear behavior in very crucial way. Range of validity of so-called quasi-linear approximation appears to be restricted to very small amplitude of disturbance. (Atomindex citation 11:501051)

IPPJ-369 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Anomalous Plasma Transport Due to Electron Temperature Gradient Instability.
S. Tokuda, H. Ito, and T. Kamimura. Jan 79, 50p
U.S. Sales Only.

The collisionless drift wave instability driven by an electron temperature inhomogeneity (electron temperature gradient instability) and the enhanced transport processes associated with it are studied using a two-and-a-half dimensional particle simulation code. The simulation results show that quasi-linear diffusion in phase space is an important mechanism for the saturation of the electron temperature gradient instability. Also, the instability yields particle fluxes toward the hot plasma regions. The heat conductivity of the electron temperature perpendicular to the magnetic field, T sub(e'), is not reduced by magnetic shear but remains high, whereas the heat conductivity of the parallel temperature, T sub(e''), is effectively reduced, and the instability stabilized. (Atomindex citation 11:501090)

JAERI-M-7966 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Calculation of Ion Beam Species Extracted from a Hydrogen Ion Source.
S. Tanaka, and T. Shibata. Nov 78, 35p
In Japanese.
U.S. Sales Only.

Ion species from a hydrogen ion source are calculated as a function of the electron density on the assumption that the energy distribution of electrons in the source is Maxwellian with temperatures 8 to 12 eV. The beam fraction of ion species depends only on the electron density, and the proton ratio increases with electron density. (Atomindex citation 11:501087)

JAERI-M-8060 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
X-Ray Emission from Hot Plasma.
S. Hayakawa, and T. Kato. Jan 79, 54p
U.S. Sales Only.

X-ray emission from hot plasmas is discussed with a critical review of different theories. The results given in the present paper are complementary to those given by Kato in the sense that the present paper is introductory to the paper by Kato. The contents of the present paper are; 1. Introduction 2. Ionization and Recombination Rate Coefficients 3. Relative Abundances of Ions 4. Intensity and Spectra of Radiation 5. Comparison with Earlier Results 6. Emission and Absorption Lines. (Atomindex citation 11:501028)

KFTI-79-10 PC **A02**/MF **A01**
Akademiya Nauk USSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Theory of Transfer Processes in a Toroidal Plasma.
V. V. Dolgopolov. 1979, 14p
In Russian.
U.S. Sales Only.

Transfer processes in plasma filament situated in the inhomogeneous magnetic field, when the electron plasma component moves relative to ion one along the magnetic field, are studied in the kinetic approach. The contitions at which the electron heat conduction becomes abnormally large are found out. It is shown that in this case the temperature of electrons can not exceed some critical value. The application of the above results for description of plasma behaviour in tokamaks is discussed. (Atomindex citation 11:501010)

LA-UR-80-1109 MF **A01**
Los Alamos Scientific Lab., NM.
Measurements of Electron Heat Flow Along a DC Magnetic Field in Strong Temperature Gradients.
R. S. Massey, J. C. Ingraham, B. L. Wright, and H. Dreicer. 1980, 11p CONF-800441-4
Contract W-7405-ENG-36
International symposium on physics and open-ended fusion systems, Tsukuba, Japan, 15 Apr 1980.
Microfiche copies only.

Measurements of electron heat flow parallel to B are performed on a fully -ionized quiescent plasma column under conditions for which the electron-electron collisional mean free path, l/sub ee/, is not small relative to the electron temperature-gradient scale-length. Pulsed microwave heating at one location on the column and nonperturbing microwave resonator measurements of temperature at two locations on the column are used to create and to measure the heat flow. Results are compared with the predictions of a 1-D heat diffusion code that has a parameter, alpha , multiplying the Spitzer heat conductivity coefficient, and that also has provision for limiting the heat flux to q/sub L/ = beta nkT sqrt kt/m (where beta is an adjustable parameter) in order to model the transition to larger values of (l/sub ee/T)dT/dx/. (ERA citation 05:025013)

NIIEFA-K-0327 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Peculiarities of Laser Radiation-Dense Plasma Interaction at Large Nonlinearity Parameters.
A. A. Gorokhov, L. V. Dubovoi, and V. D. Dyatlov. 1977, 46p
In Russian.
U.S. Sales Only. Microfiche copies only.

The results of the experimental investigation of the large intensity Nd-glass laser radiation interaction with dense high-temperature plasma are given. The reflection of radiation incident on the plane lithium deuteride target at the light intensities up to 3x10 exp 16 W/cm exp 2 has been studied for the first time. Monotonic decrease of the reflection at the light intensity increase within (10 exp 13 -10 exp 16) W/cm exp 2 has been found. The spectral characteristics and angular distribution of scattered radiation have been investigated. The electron plasma "temperature" determined by the absorbing foil method has been up to 10 keV. Based upon the obtained facts the conclusion about the significant nonlinear character of the intense laser beam-dense hot plasma interaction is made. (Atomindex citation 11:501022)

N80-27189/3 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
Plasma Physics Analysis of SERT-2 Operation.
H. R. Kaufman. Jan 80, 59p NASA-CR-159814
Grant NSG-3011

An analysis of the major plasma processes involved in the SERT 2 spacecraft experiments was conducted to aid in the interpretation of recent data. A plume penetration model was developed for neutralization electron conduction to the ion beam and showed qualitative agreement with flight data. In the SERT 2 configuration conduction of neutralization electrons between thrusters was experimentally demonstrated in space. The analysis of this configuration suggests that the relative orientation of the two magnetic fields was an important factor in the observed results. Specifically, the opposed field orientation appeared to provide a high conductivity channel between thrusters and a barrier to the ambient low energy electrons in space. The SERT 2 neutralizer currents with negative neutralizer biases were up to about twice the theoretical prediction for electron collection by the ground screen. An explanation for the higher experimental values was a possible conductive path from the neutralizer plume to a nearby part of the ground screen. Plasma probe measurements of SERT 2 gave the clearest indication of plasma electron temperature, with normal operation being near 5 eV and discharge only operation near 2 eV.

N80-27190/1 PC **A04**/MF **A01**
Toronto Univ., Downsview (Ontario). Institute for Aerospace Studies.
A Study of the Characteristics of an Atmospheric Pressure Microwave-Induced Argon Plasma.
S. K. Wong. May 80, 62p UTIAS-TN-225, CN-ISSN-0082-5263

A microwave induced argon plasma is produced at atmospheric pressure in a capacity loaded resonant cavity operated at 2450 MHz and 100 to 300 watts. Plasma parameters such as electron temperature and electron density are measured spectroscopically under various argon flow rates and power inputs to the cavity. The gas translational temperature of the plasma is estimated by measuring the rotational temperature of C2 molecules, this is done by mixing 5% of methane by volume with the argon gas. The general characteristics of the microwave induced argon plasma as a possible ion source for mass spectroscopy are studied.

N80-27194/3 PC **A06**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Electron Beam Scattering in Partially Ionized Gases.
D. R. Gross. Mar 79, 117p OUEL-1283/79
Contract AT/2057/042

The scattering of a tenuous (10 to the minus 10th power amps) medium energy (10-30 KeV) electron beam in a partially ionized gas was investigated with a view to developing a diagnostic for weakly ionized low density gas flows. An electron beam 100 microns in diameter was passed through a hollow cathode discharge in a direction parallel to the axis of the cylindrical cathode. The discharge occurred in helium and argon gases at pressures between 0.3 and 2.0 torr. Maintaining the electron beam current at 10 to the minus 10th power amps ensured that any collective interaction between the beam and the plasma would be negligible in comparison with the collisional interaction. Beam profile results were in fair agreement with Langmuir probe results taken in the same discharge. Typically, ion densities of the order of 3 x 10 to the 17th power per cu were found. It is concluded that the electron beam constitutes a valid diagnostic for measurements of charged particle density, and that the correctness of the theories of multiple scattering in plasma is indicated.

N80-27195/0 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
A Program to Solve Rotating Plasma Problems.
M. Bakker, and M. S. Vandenberg. Aug 79, 39p MC-NW-70/79
Submitted for Publication.

It is shown that the solution of a rotating plasma problem minimizes a suitably chosen functional. The variational problem is solved by means of the Ritz-Galerkin method using piecewise bilinear functions and applying Newton-Cotes-like quadrature. The resulting linear system with sparse nonnegative definite matrix is solved by an adaptive conjugate gradient method. A documented FORTRAN program is presented for solving the elliptic boundary problem.

N80-27196/8 PC **A02**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany, F. R.). Unternehmensbereich Apparate.
Diagnostics and Simulation of the Initial Ionization in NaCl-Contaminated Argon Plasma.
C. P. Schneider, and G. Hahne. 17 Jul 79, 19p MBB-UA-498-79OE

A method for cleaning shock tubes was investigated which involves glass bead peening of the shock-tube walls followed by multiple flushing of the tube. This method, however, left a practically irreducible and non-negligible residue of sodium chloride vapor in the tube. The observed time dependence of the electron density, the electron temperature, and the emitted sodium D light, in shock-heated argon contaminated by a small amount of sodium chloride vapor was simulated theoretically. It was found that accounting for the effects of contaminants requires important revisions in rate constants for pure argon from previously determined values.

PPPL-1650 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Functional Integral Approach to Classical Statistical Dynamics.
R. V. Jensen. Apr 80, 49p
Contract EY-76-C-02-3073

A functional integral method is developed for the statistical solution of nonlinear stochastic differential equations which arise in classical dynamics. The functional integral approach provides a very natural and elegant derivation of the statistical dynamical equations that have been derived using the operator formalism of Martin, Siggia, and Rose. (ERA citation 05:023337)

PPPL-1654 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Suppression of Lower Hybrid Wave Coupling Due to the Ponderomotive Force.
J. R. Wilson, and K. L. Wong. Apr 80, 18p
Contract EY-76-C-02-3073

The coupling efficiency from a slow-wave structure to lower hybrid waves is investigated experimentally. At moderate electric field strengths large edge density changes are observed. Wave trajectory modifications and departure from linear coupling are observed consistent with these changes and in good agreement with a simple nonlinear theory that includes the ponderomotive force. (ERA citation 05:023318)

PPPL-1656 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Two-Dimensional Calculation of Finite-beta Modifications of Drift and Trapped-Electron Modes.
G. Rewoldt, W. M. Tang, and E. A. Frieman. May 80, 20p
Contract EY-76-C-02-3073

A previous electrostatic calculation for the two-dimensional spatial structure of drift and trapped-electron modes is extended to include finite- beta effects. Specifically, the parallel perturbed vector potential and the parallel Ampere's law are added to the calculation. Illustrative results are presented. (ERA citation 05:023342)

PPPL-1657 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Creating an Anisotropic Plasma Resistivity with Waves.
N. J. Fisch, and A. H. Boozer. May 80, 10p
Contract EY-76-C-02-3073

An anisotropic plasma resistivity may be created by preferential heating of electrons traveling in one direction. This can result in a steady-state toroidal current in a tokamak even in the absence of net wave momentum. In fact, at high wave phase velocities, the current associated with the change in resistivity is greater than that associated with net momentum input. An immediate implication is that other waves, such as electron cyclotron waves, may be competitive with lower-hybrid waves as a means for generating current. An analytical expression is derived for the current generated per power dissipated which agrees remarkably well with numerical calculations. (ERA citation 05:023338)

RL-78-036 MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Megagauss Magnetic Field Profiles in Laser Produced Plasmas.
A. Raven, O. Willi, and P. T. Rumsby. May 78, 12p
U.S. Sales Only. Microfiche copies only.

Measurement of spatial profiles of self generated magnetic fields in Nd:laser produced plasmas have been made with high temporal and spatial resolution (30ps, 1.5 mu m) by simultaneous Faraday rotation and interferometry using a Raman shifted second harmonic probe beam. (Atomindex citation 09:415755)

RL-79-061 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Saturation of Brillouin Scattering in a Laser Driven Ablation Plasma.
R. G. Evans. Aug 79, 8p
U.S. Sales Only.

In a laser driven ablation plasma the ablation process leads to a significant cooling of the ions. The reduced ion temperature leads to large Brillouin reflectivities which may be close to 100% at laser wavelengths of 1 mu . (Atomindex citation 11:498005)

TRITA-PFU-78-07 MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Stability of Boundary Layers in Gas Mantle Systems.
Thesis (Ph.D.),
D. Ohlsson. Oct 78, 14p
U.S. Sales Only. Microfiche copies only.

In this thesis a systematic investigation of the stability properties of the partially ionized boundary regions of gas mantle systems for a large class of dissipative magneto-hydrodynamic modes is presented. In the partially ionized boundary regions of gas mantle systems several strong stabilizing mechanisms arise due to coupling between various dissipative effects in certain parameter regions. The presence of neutral gas strongly enhances the stabilizing effects in a dual fashion. First in an indirect way by cooling the edge region and second in a direct way by enhancing viscous and heat conduction effects. It has, however, to be pointed out that exceptions from this general picture may be found. The stabilizing influence of neutral gas on a large class of electrostatic as well as electromagnetic modes in the boundary regions of gas blanket systems is contrary to what has been found in low density weakly ionized plasmas. In these latter cases presence of neutral gas has even been found to be responsible for the onset of entirely new classes of instabilities. Thus there is no universal stabilizing or destabilizing effect associated with plasma-neutral gas interaction effects. (Atomindex citation 10:434685)

UCRL-Trans-11588 PC **A03**/MF **A01**
Single- and Double-Frequency Resonance Heating in Laser-Irradiated Plasmas.
T. Weihan, and X. Zhizhan. Mar 77, 42p
Contract W-7405-ENG-48
A, Wu Li Hsueh Pao, 26 n2 P144-148 Mar 1977.

Accurate solutions for single-frequency heating conditions have been obtained based on equations derived for laser plasma electron-ion coupling. The threshold values and rates of increase of various unstable oscillations under double-frequency resonance heating conditions have also been obtained and compared with those under single-frequency heating conditions. (ERA citation 05:023322)

UCRL-83053 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Angular Distribution of Suprathermal X-Rays from Laser-Produced Plasma.
C. L. Wang, H. N. Kornblum, and V. W. Slivinsky. 18 Feb 80, 11p CONF-791135-10
Contract W-7405-ENG-48
21. annual meeting of the American Physical Society, Boston, MA, USA, 12 Nov 1979.

Observations were made of pronounced peaks in the suprathermal x-ray angular distribution from disk and ball targets irradiated with 1.06 mu m light from Shiva laser of the Lawrence Livermore Laboratory. The output energy and pulse widths of this Nd:glass laser system during the experiment ranged from 0.5 to 4 kj and 80 to 200 ps, respectively. The x-rays emitted from the target were filtered with various absorbers and detected with NaI(Tl) crystals coupled to photodiodes. Two peaks were observed near 60 and 105 degrees with respect to the incident beams. In separate experiments during the 2ns operation of the laser, x-ray films were used to record the angular distributions. The film exposures indicate that there are definitely peak structures, but exact correlation with the result of NaI detectors has yet to be established. (ERA citation 05:023325)

UCRL-84301 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Nonlinear Evolution of Resistive Interchange Modes in Reversed Field Pinches.
D. D. Schnack, and J. Killeen. Apr 80, 6p
Contract W-7405-ENG-48

The results are presented of the application of a two dimensional resistive MHD computer code to the nonlinear evolution of resistive interchange modes in tearing-mode-stable RFP equilibria. One finds that the m = 1 mode is insignificant when the singular surface is outside the field reversal point, and is more active nonlinearly but still fairly localized when the singular surface lies in the inner regions of the plasma. The m = 0 mode, which is not present in tokamaks, is found to lead to highly distorted flux surfaces and interchange vortices of large radial extent when beta is near the Suydam marginal point. However, if the initial beta is sufficiently small, this mode remains localized allowing significant Ohmic heating of the pinch to occur. (ERA citation 05:023344)

20J. Quantum Theory

AD-A085 946/2 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal AL Research Directorate
Recent Advances in Cooperative Phenomena and Matter Field Interactions.
Technical rept.,
D. W. Howgate, C. M. Bowden, C. A. Coulter, and C. C. Sung. Jan 80, 34p Rept no. DRSMI/RR-80-2
Presented at the Vavilov Conference on Coherent and Nonlinear Optics (6th), Novosibirsk, USSR, 20-22 Jun 79.

Partial Contents: Interaction of a Molecular Gas with the Electromagnetic Field; An Effective Hamiltonian for the Treatment of N Identical Two-Level Atoms Interacting with the Electromagnetic Field; and Light-Atom Interaction in Cooperative Phenomena in Quantum Optics.

FRNC-TH-724 MF **A01**
Paris-11 Univ., Orsay (France).
Semiclassical Expansions.
Thesis,
A. Voros. 1977, 219p
In French.
U.S. Sales Only. Microfiche copies only.

The various semiclassical methods dealing with quantum steady state problems, especially the calculation of bound states and energy levels of quantum systems (spinless, nonrelativistic) are compared. Quantum states are semiclassically described by an expansion in h (Planck constant) whose coefficients are classical phase-space distributions, in view of the pseudo-differential operator theory and Wigner representation. The dynamical systems envisaged are: ergodic type systems with d>I (the number of degrees of freedom), where Thomas-Fermi methods are applied; fully integrable systems with d=I, that are dealt with by the BKW method, and quasi-integrable systems with d<I, for which generalized BKW methods are given, relating to coherent state calculation, and also ressembling to the perturbation quantum theory and classical theory of same name. The semiclassical methods using path integrals are excluded, the formal structure of semiclassical expansions is emphasized with discording any convergence problems, and the 'h' series computed for the eigenstates and energy levels are assumed to represent their asymptotic expansions without resumming these series. Most of the algebraic calculations have been computed and are directly reproduced in the paper. (Atomindex citation 09:392736)

20K. Solid Mechanics

AD-A085 822/5 PC **A03**/MF **A01**
State Univ of New York At Buffalo Dept of Engineering Science Aerospace Engineering and Nuclear Engineering
Torsional Waves in a Bimetallic Cylinder. Part I. Axially Homogeneous Case.
Technical rept.,
R. K. Kaul, R. P. Shaw, and W. Muller. Oct 79, 43p Rept no. 107
Contract N00014-75-C-0302

The dispersion spectrum is found for axially symmetric torsional waves in an elastic, bimetallic rod with cylindrical core and concentric outer casing. Plotting of the various branches of the spectrum is simplified by the presence of discrete invariant points which are independent of the material properties, and through which the spectral lines must pass. The slope and curvature of the spectral lines at cut-off frequencies, the asymptotic approximations at high frequency, the non-existence of complex branches, the problem of co-existence and the concept of energy flow are also studied. (Author)

AD-A086 006/4 PC **A03**/MF **A01**
George Washington Univ Washington DC School of Engineering and Applied Science
A Comparative Study on the Elastic-Plastic Collapse Strength of Initially Imperfect Deep Spherical Shells.
Robert Kao. Feb 80, 41p
Contract N00014-75-C-0946

A finite-difference method for the large deformation elastic-plastic analysis of spherical caps is applied to predict the collapse strength of initially imperfect deep spherical shells. Twelve uniformly loaded hemispherical shell models with flat spots at their apex are analyzed. For each model, a number of shallow spherical regions containing the flat spot are selected from its domain. One of these selected shallow regions yields a minimum buckling pressure; this minimum value is taken as the theoretical buckling load for the shell model under consideration. Present solutions are in good agreement with existing experimental and empirical results. The good comparison suggests that initially imperfect deep spherical shells may be analyzed by using a much simpler mathematical model - the spherical cap, and thus the analytical cost may be greatly reduced. This also demonstrates that the collapse of imperfect spherical shells is primarily a local phenomenon and therefore dependent on local geometry. Consequently, the presence of initial imperfections must be fully taken into consideration in any large deformation inelastic buckling analysis before such analysis can be expected to quantitatively predict the collapse strength of practical shell structures. (Author)

AD-A086 110/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Stress Analyses of OD Notched Thick-Walled Cylinders Subjected to Internal Pressure or Thermal Loads.
Technical rept.,
J. A. Kapp, and G. A. Pfiegl. Feb 80, 48p
ARLCB-TR-80005, AD-E440 069
Includes errata sheet dated 20 Jun 80.

Finite element stress analysis has been performed to determine the effects of two OD notch configurations in a cylinder subjected to internal pressure, or containing autofrettage residual stress. The effects on the residual stresses were determined by simulating these stresses with active temperature loads. The results show that the deeper of the two notch configurations is far more severe resulting in a maximum stress concentration factor of 2.9. The shallower notch has a maximum stress concentration factor of 2.0. An additional result is that by introducing notches in autofrettaged cylinders a significant amount of the residual stresses are relieved which indicates that smaller applied pressures can be contained by these cylinders, than in smooth cylinders before yielding occurs. The results also show that the possibility of OD initiated fatigue failure is greatly increased.

AD-A086 113/8 PC **A07**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Aeronautical and Astronautical Engineering
Finite Element Method of Stress Analysis of Nonaxisymmetric Configurations.
Final rept. Mar 76-Dec 78,
Adam R. Zak, and James N. Craddock. Apr 80, 140p ARBRL-CR-00423, AD-E430 467
Contract DAAD05-76-C-0743

A finite element method of analysis is developed for structural configurations which are derived from axisymmetric geometries but contain definite nonaxisymmetric features in the circumferential direction. The purpose of the present analysis is to develop a method which will take into consideration the fact that the stress and strain conditions in these geometries will be related to the corresponding axisymmetric solution. The analysis is developed in terms of a cylindrical coordinate system r, phi, and z. As the first step of the analysis, the geometry is divided into several segments in the r-phi plane. Each segment is then divided into a set of quadrilateral elements in the r-z plane. The axisymmetric displacements are obtained for each segment by solving a related axisymmetric configuration. A perturbation analysis is then performed to match the solutions at certain points between the segments, and obtain the perturbation displacements for the total structure. The total displacement is then the axisymmetric displacement plus the perturbation displacement. The stresses and strains are then calculated at any desired point once the total displacements are known. The method is then applied to several examples to illustrate the accuracy of the method. The method of analysis is developed in two versions. The first version is for elastic, orthotropic materials. The second method is for elastic-plastic materials with a kinematic strain hardening model. As in the case of the elastic version, the second version also allows for orthotropic properties and the yield criterion is based on the Hill's yield function which reduces in the limit to von Mises-Hencky for isotropic materials.

N80-26694/3 PC **A99**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The NASTRAN User's Manual (Level 17.0).
Dec 79, 867p NASA-SP-222(04)

NASTRAN embodies a lumped element approach, wherein the distributed physical properties of a structure are represented by a model consisting of a finite number of idealized substructures or elements that are interconnected at a finite of grid points, to which loads are applied. All input and output data pertain to the idealized structural model. The general procedures for defining structural models are described and instructions are given for each of the bulk data cards and case control cards. Additional information on the case control cards and use of parameters is included for each rigid format.

N80-26696/8 PC **A05**/MF **A01**
General Electric Co., Philadelphia, PA.
Vibration Analysis of the Long Duration Exposure Facility (LDEF) Using SPAR.
H. Edighoffer. Jun 80, 96p NASA-CR-159239
Contract NAS1-14375

The structural modeling of the Long Duration Exposure Facility (LDEF) utilizing the SPAR system of computer programs for vibration analysis is discussed. The technical areas of interest were: (1) development of the LDEF finite element model; (2) derivation of tray effective panel stiffness matrix using finite element tray models; (3) assessment of attachment conditions and end fitting flexibility by comparing SPAR with test static displacements; (4) SPAR grouping; and (5) derivation of the LDEF frequencies and mode shapes and comparing them with tests. Special detailed finite element modeling was required to obtain good agreement between analytical and test vibration modes. An orthotropic panel in the overall model was developed. Orthotropic stiffness for this panel were obtained from finely detailed statically loaded SPAR models which included stiffness and allowed for partial relative sliding of the tray clamping attachments. Sensitivity to LDEF joint boundary conditions was determined, and static test data proved valuable in assessing modeling of local end fittings.

N80-26699/2 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Optimization and Stability of Columns under Opposing Distributed and Concentrated Loads.
S. Adali. Oct 79, 45p CSIR-TWISK-122

A bar subjected to simultaneous compressive and tensile axial loads, which behaves like either a column or tie, depending on the relative magnitudes of these loads is examined along with the resulting stability boundary which separates a conditionally stable region (column action) from an unconditionally stable region (tie action). The optimal design of the structure, when in the conditionally stable region is presented. The stability boundaries of uniform and optimal columns are given for various problem parameters. The columns are elastically clamped at one end and free at the other, and subjected to nonuniformly distributed and concentrated loads which act in opposite directions. The cross sectional area is determined, such as to maximize the load carrying capacity of the column subject to volume and thickness constraints. That variational bounds are given which provide upper and lower estimates on the buckling loads of optimal columns. Stability problems are formulated which arise in connection with columns attached to the rim or hub of a rotating wheel.

N80-26701/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Deflections of Beam Columns on Multiple Supports.
W. J. Stroud, W. H. Greene, and M. S. Anderson. Jun 80, 19p NASA-TM-81829

Lateral deflections of beam columns on multiple equally spaced supports are calculated using the STAGS nonlinear structural analysis computer program. Three lateral loadings are considered, uniform, linear, and uniform over only the center bay. Two types of boundary conditions are considered at the end supports, clamped, and simple support. The effect of an initial sinusoidal imperfection are considered. Deflections in the center and end bays of the beam columns are presented as a function of applied axial compressive load. As the number of bays becomes large, the effect of boundary conditions on the deflections in the center bays diminishes. For cases involving a uniform or linearly varying load, imperfections can have a much larger effect on deflections in the center bays than can lateral pressure.

N80-26705/7 PC **A04**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
On a Penalty Function Method for the Simulation of Mechanical Systems Subject to Constraints.
P. Loetstedt. 1979, 51p TRITA-NA-7919
Sponsored in Part by Swed. Inst. Of Appl. Math.

The mathematical properties of a penalty method for the digital simulation of mechanical systems of rigid bodies with constraints are investigated. The solutions of the systems of ordinary differential equations are expanded in Taylor series about a small parameter dependent on the penalty function. Under certain assumptions, the solution is close to that obtained by Lagrange multipliers. A Coulomb friction model is also presented and analyzed. This model has deficiences which are pointed out in two examples.

N80-26706/5 PC **A04**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
A Numerical Method for the Simulation of Mechanical Systems with Unilateral Constraints.
P. Loetstedt. 1979, 72p TRITA-NA-7920
Sponsored in Part by Swed. Inst. Of Appl. Math.

The simulation of the time dependent behavior of mechanical systems of rigid bodies on digital computers calls for the solution of second order ordinary differential equations with unilateral constraints. The underlying principle for the construction of the computational scheme is the Gaussian principle of least constraint. The Coulomb law of friction is modified slightly to allow an efficient solution of systems where such friction plays an important role. Limited computational experience is reported.

N80-26707/3 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
On the Numerical Simulation of the Motion of a System of Rigid Bodies Subject to Variable Constraints.
P. Loetstedt. 1979, 11p TRITA-NA-7922

Sponsored in Part by Swed. Inst. Of Appl. Math.

A summary is presented of a thesis consisting of four separate papers on the simulation of mechanical systems with restraints, the use of penalty functions, numerical methods, and the interactive simulation of the progressive collapse of a building.

N80-26708/1 PC **A03**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Inelastic Buckling of Columns Partially Restrained Against Sway and Rotation.
G. Oliveto. 1979, 26p OUEL-1298/79
Sponsored in Part by Transport and Road Res. Lab. And Cnr.

A computer program is described for calculating the buckling load and the buckling shapes of columns restrained at intervals against sway and/or rotation by elastic springs. Beyond the elastic limit of the material, the analysis is performed by introducing the tangent modulus in a procedure similar to that of Engesser-Shanley for simple columns. The program is particularly suitable for a desk computer because of the very small amount of storage required. Some numerical results are presented.

N80-27148/9 PC **A02**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
The Signorini Problem for a Cosserat Plate.
J. R. Turner. 1979, 23p OUEL-1296/79

The potential of Cosserat plate theory to give physically acceptable solutions to a number of practical plate problems involving unilateral constraints is investigated. Example solutions to three problems are obtained by the finite element method. These are the Signorini problem of a plate bent over a rigid parabolic obstacle, the problem of a plate resting on a rigid, frictionless foundation indented from above by a rigid frictionless ball, and that of a plate bonded to a rigid foundation indented from above by a rigid frictionless ball.

PB80-200785 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Stress Intensity Distributions for Natural Flaw Shapes Approximating 'Benchmark' Geometries.
Feb 80, 32p VPI-E-80-17

Over the past decade, the first author and his colleagues have evolved an experimental technique which couples the field equations of linear elastic fracture mechanics with the frozen stress photoelastic method for generating natural flaw shapes and their corresponding stress intensity distributions. The present paper focuses upon the application of this technique to two surface flaw geometries approximating benchmark geometries and comparing with results from the recent literature in order to assess the validity of the semi-elliptic flaw shape assumption for the surface flaw in numerical models and to quantify any observed deviations.

PB80-813447 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mathematical Analysis of Stress Cracks. 1977-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Jun 80,
Guy E. Habercom, Jr. Jul 80, 146p
Supersedes NTIS/PS-79/0804 and NTIS/PS-78/0768. See also 1964-1973, NTIS/PS-75/466, and 1974-1976, NTIS/PS-79/0803.

Stress cracks are analyzed by mathematical methods, including extensive use of finite element analysis. Various materials, including metals, wood, composites, and rock are investigated. (This updated bibliography contains 140 citations, 22 of which are new entries to the previous edition.)

20L. Solid-State Physics

AD-A085 891/0 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Electrical Properties and Photoluminescence of Germanium-Implanted Gallium Arsenide.
Master's thesis,
Siu-Sing Chan. Dec 79, 55p Rept nos. R-872, UILU-ENG-80-2204
Contracts N00014-76-C-0806, N00014-79-C-0424

The data presented show that Ge-implanted GaAs has a complex amphoteric behavior which is controlled by the implantation dose, implantation temperature and anneal temperature. Annealing was performed with r.f. plasma deposited Si3N4 as the encapsulant. Implantations at -100 C resulted in p-layers while those performed at 100 C and above resulted in n-layers regardless of the dose and anneal temperature. Room temperature implants resulted in p- or n-layers depending on the combination of dose and anneal temperature. Electrical activation and carrier mobilities in the implanted layers were low. Low temperature (6 K) photoluminescence indicated that a significant amount of residual damage remained after annealing. Carrier concentration profiles in implanted layers and junction characteristics of Ge-implanted GaAs planar diodes are also presented. (Author)

CEA-CONF-4444 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Lab. d'Electronique et de Technologie de l'Informatique.
High Dose Implantations of Antimony for Buried Layer Applications.
J. P. Gailliard, M. Dupuy, M. Garcia, J. C. Roussin, and M. Roche. 12 Sep 78, 10p CONF-780932-9
Conference on ion beam modification of materials, Budapest, Hungary, 4 Sep 1978.
U.S. Sales Only.

Electrical and physical properties of high dose implantations of antimony in silicon have been studied for use in buried layer applications. The results have been obtained both on <111> and <100> oriented silicon wafers. Following implantations which lead to amorphization we perform an annealing at 600 exp 0 C for 10 mn in order to recrystallize the layer. The observed electrical properties (mu , R) show that the concentration of electrically active antimony ions is greater than that predicted from the solubility of antimony in silicon. Further annealing (in the range 1050 exp 0 - 1200 exp 0) induces: firstly a precipitation of the Sb and secondly a diffusion and dissolution of the precipitates. There is a different evolution of the defects in the <111> and <100> silicon slices. T.E.M. reveals no defects in the <100> wafers after one hour annealing at 1200 exp 0 C, whereas defects and twins remain in <111> wafers. Having obtained the evolution of R with time and temperature it is then determined the implantation and annealing conditions which lead to the low resistivity (R = 10) needed for buried layer applications. Results with very many industrially made devices are discussed. (Atomindex citation 11:497888)

CEA-CONF-4445 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Lab. d'Electronique et de Technologie de l'Informatique.
Ion Implantation in Superconducting Niobium and Nb sub 3 Sn Thin Films: Adjustment of Josephson Microbridges and SQUID Devices.
J. Y. Robic, J. Piaguet, D. Duret, J. C. Veler, and J. L. Veran. 15 Sep 78, 10p CONF-780932-10
Conference on ion beam modification of materials, Budapest, Hungary, 4 Sep 1978.
U.S. Sales Only.

The principles of operation of Josephson junctions and SQUIDS are resumed. An ion implantation technique for the adjustment of the critical current is presented. High quality superconducting thin films were obtained by electron gun evaporation of niobium on heated substrates. Polycrystalline Nb sub 3 Sn was made by annealing (1000 K, 10 exp -6 Torr) a multilayer structure of successively evaporated niobium and thin films. Selected ions (helium, neon, argon) were implanted at doses ranging from 10 exp 13 to 10 exp 17 cm exp -2 . After implantation the critical temperature, the critical current and the normal resistivity were measured on special photoetched geometries. The variations of these electrical properties depend on the nuclear energy loss. The critical temperature of Nb sub 3 Sn is decreased by ion implantation and can be increased again by a new annealing. The parameters of the ion implantation were defined in order to obtain a critical temperature slightly higher than the operating temperature. The geometries of the microbridges and the implanted areas where then chosen to obtain appropriate criticals currents (approximately 10 mu A) at the operating temperature. The obtained microbridges were used as junction elements in superconducting quantum interference devices. (Atomindex citation 11:497927)

CONF-791102-169 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Paramagnetic Properties of Mixed-Matrix NbTi Conductors.
S. S. Shen. 1979, 4p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Magnetization measurements are performed up to 4T on a series of samples with different compositions of Cu, CuNi, and superconductors. It is observed that most samples exhibit a strong paramagnetic moment that is in contrast with the inherent hysteretic magnetization associated with superconducting filaments. Chemical analysis results of nickel contents and iron impurities are also reported and correlated with the measured paramagnetic properties. For samples with high contents of nickel (Cu-30% Ni) and iron impurities (greater than or equal to 500 ppM), the saturated paramagnetic magnetization field can be as high as 0.02T. (ERA citation 05:024513)

CONF-791112-60 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Ion Implantation and Laser Annealing of High T/sub C/ Superconducting Materials.
B. R. Appleton, C. W. White, B. Stritzker, O. Meyer, and J. R. Gavaler. Dec 79, 7p
Contract W-7405-ENG-26
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The materials investigated consisted of thin films of Nb-Ge, V-Si, Nb-N, Nb-C-N and Nb-Ir prepared by evaporation, sputtering or CVD onto substrates of alumina, sapphire or polycrystalline Hastelloy B. Single crystals of Nb sub 3 Ir, NbN, V sub 3 Si and V sub 3 Ge were also studied and some laser annealing results will be presented. Laser annealing was performed in air using a Q-switched, (15 x 10 exp -9 sec duration), Ruby laser with energy densities ranging from 0.1 to 10 J/cm exp 2 . Single, sometimes overlapping, pulses were used. The texture, microstructure and phase composition of the films were examined by x-ray diffraction. Ion scattering and nuclear reaction analysis were used to determine stoichiometries versus depth in the films. Near-surface melting was monitored from ion scattering measurements of the depth profiles of an ion implanted marker species before and after laser annealing. Surface topography was monitored with optical microscopy and SEM. Ion channeling analysis was utilized to determine lattice defect configurations and damage effects to the single crystal samples. These various analyses were correlated to measurements of superconducting transition temperatures, T/sub c/, before and after laser annealing. (ERA citation 05:023309)

IPPJ-362 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Development of Soliton Physics: An Analysis Based on Information Retrieval.
Y. H. Ichikawa, T. Ohe, and Y. Kanada. 1978, 20p
U.S. Sales Only.

This paper uses information retrieval from available data bases such as INSPEC tapes in an attempt to quantify and demonstrate trends in the recent development of Soliton physics research. The data shows that Soliton physics research may be classified into three stages according to the annual numbers of published scientific papers (N): Stage 1: N - 10 exp 0 Gestation (up to 1965) Stage 2: N - 10 exp 1 Introduction (1966 - 1971) Stage 3: N - 10 exp 2 Growth (1971 - present). (Atomindex citation 11:503165)

JAERI-M-8134 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Measurement of Heat Transfer Characteristics and Stability Analysis of Large Superconductors.
M. Nishi, T. Ando, K. Yoshida, and S. Shimamoto. Mar 79, 28p
In Japanese.
U.S. Sales Only.

Boiling helium heat transfer characteristics of grooved model conductors were measured. With these data, stability of large superconducting toroidal coils were analyzed. In this analysis, the distributions of magnetic field and heat transfer characteristic along conductor were considered. (Atomindex citation 11:501071)

LA-UR-80-1000 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Electron Response Theory of Lattice Vibrations: Emergence of Concepts and a Glance at the Future.
D. C. Wallace. 1980, 21p CONF-800468-1
Contract W-7405-ENG-36
Condensed Matter Division of European Physical Society conference, Antwerp, Belgium, 9 Apr 1980.

Lattice dynamics, the theory of phonons, is reviewed. (ERA citation 05:023303)

LA-8320-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
LASL Nb sub 3 Ge Conductor Development. Fourteenth Quarterly Progress Report, October 1-December 31, 1979.
M. P. Maley. Apr 80, 19p
Contract W-7405-ENG-36

The fourteenth quarterly report of the Los Alamos Scientific Laboratory program to develop Nb sub 3 Ge as a superconductor with potential applications to superconducting power transmission lines covers the period Oct. 1-Dec. 31, 1979. Materials research aimed at improving the performance of Nb sub 3 Ge tape conductor is described. A new ac-loss apparatus designed to measure hysteretic and ohmic losses in tape conductors was employed to study the losses in seventeen Nb sub 3 Ge tape samples with currents induced around the circumference of the tapes. Tapes with Nb sub 3 Ge thickness less than or equal to 3.0 mu m have a continuous coating of Nb sub 3 Ge around the edges and that such tapes exhibit low total losses (less than or equal to 10 mu W/cm exp 2 at 500 rms A/cm). Thicker layers of Nb sub 3 Ge do not maintain edge integrity and exhibit large ohmic losses caused by the full transport current flowing through the normal substrate. Work on Nb-Ge-Ga ternaries by chemical vapor deposition has concentrated on the preparation of reproducible deposits of A-15 Nb sub 3 Ga. (ERA citation 05:024969)

N80-27197/6 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Characterization and Growth of Epitaxial Layers of GaAs Exhibiting High Resistivity for Ionic Implantation.
Dec 79, 91p NASA-TM-75747, LEP-79/19
Contract NASW-3198
Transl. Into English of Final Report (Limeil-Brevannes, France), Lep-79/19, Sme-441-H and Dgrst-76-7-0067, Dec. 1977 p 1-90. Translation Was Announced as N79-24881. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Lab. D'Electronique et de Physique Appliquee, Limeilbrevannes, France.

Either classical or low temperature epitaxial growth techniques can be used to control the deposition of buffer layers of GaAs on semiconducting substrates and to obtain the resistivity and purity desired. Techniques developed to study, as a function of thickness, the evolution of mobilities by photoHall, and the spectroscopy of shallow and deep centers by cathodoluminescence and current transients reveal one very pure layer of medium resistivity and high mobility, and another 'dead layer' of elevated resistivity far from the surface. The highly resistive layer remains pure over several microns, which appears interesting for implantation.

PATENT-4 181 538 Not available NTIS
Department of Energy, Washington, DC.
Method for Making Defect-Free Zone by Laser-Annealing of Doped Silicon.
Patent,
J. Narayan, C. W. White, and R. T. Young. Filed 26 Sep 78, patented 1 Jan 80, 14p PAT-APPL-945 925
Supersedes PAT-APPL-945 925-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for improving the electrical properties of silicon semiconductor material is given. The method comprises irradiating a selected surface layer of the semiconductor material with high-power laser pulses characterized by a special combination of wavelength, energy level, and duration. The combination effects melting of the layer without degrading electrical properties, such as minority-carrier diffusion length. The method is applicable to improving the electrical properties of n- and p-type silicon which is to be doped to form an electrical junction therein. Another important application of the method is the virtually complete removal of doping-induced defects from ion-implanted or diffusion-doped silicon substrates. (ERA citation 05:026093)

PB80-199904 Not available NTIS
National Bureau of Standards, Washington, DC.
High Temperature Crystals: Limitations on the Phonon Description.
Final rept.,
R. A. MacDonald, and R. D. Mountain. 1980, 4p
Pub. in Proceedings of International Conference on Phonon Scattering in Condensed Matter (3rd), Brown University, Providence, RI, August 28-31, 1979, Paper in Phonon Scattering in Condensed Matter, p137-140 1980.

The Monte Carlo method has been used to calculate the energy, pressure, and specific heat at constant volume, (C sub v), for model of rubidium. This calculation for a fully anharmonic perfect crystal, is a necessary step in understanding the anomalous behavior of the specific heat at high temperatures. The results may point to an explanation for the breakdown of the phonon description.

PB80-808835 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Color Centers and Color Center Lasers. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 196p
Sponsored in part by National Technical Information Service, Springfield, VA.

The creation processes and analyses of a variety of color centers in many types of solid state materials, and some useful applications for these defect centers, are described in the cited works. The centers are created by various forms of particle and electromagnetic radiation, including light, by heat, by stress, by crystal growth processes, and others. They are analysed by electron spin resonance (ESR), optical absorption, electron-nuclear double resonance (ENDOR), measurements of stored energy, kinetics of formation and decay, thermoluminescence, etc. Some applications cited are as laser systems, laser Q-switches, dosimeters, high-density, 3-D optical information storage (including holographic and photographic) devices, optical memories, and optical computer elements. (Contains 195 citations)

PB80-808843 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Color Centers and Color Center Lasers. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 184p
Sponsored in part by National Technical Information Service, Springfield, VA.

The creation processes and analyses of a variety of color centers in many types of solid state materials, and some useful applications for these defect centers, are described in the cited works. The centers are created by various forms of particle and electromagnetic radiation, including light, by heat, by stress, by crystal growth processes, and others. They are analysed by electron spin resonance (ESR), optical absorption, electron-nuclear double resonance (ENDOR), measurements of stored energy, kinetics of formation and decay, thermoluminescence, etc. Some applications cited are as laser systems, holographic storage media, and photographic materials. (Contains 200 citations)

PB80-808850 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Color Centers and Color Center Lasers. 1964-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1964-Apr 80,
C. Gilbert Young. May 80, 76p
Sponsored in part by National Technical Information Service, Springfield, VA.

The creation processes and analyses of a variety of color centers in many types of solid state materials, and some useful applications for these defect centers, are described in the cited works. The centers are created by various forms of particle and electromagnetic radiation, including light, by stress, by crystal growth processes, and others. They are analysed by electron spin resonance (ESR), optical absorption, electron-nuclear double resonance (ENDOR), measurements of stored energy, kinetics of formation and decay, thermoluminescence, etc. Some applications cited are as laser systems, optical computer elements, holographic and other optical image storage devices, and as high-density optical memories. (Contains 79 citations)

WIS-Ph-79/37 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Phase Transitions in n=4 Type II Antiferromagnets.
D. Mukamel, and D. J. Wallace. 1979, 17p
U.S. Sales Only.

The Landau-Ginzburg-Wilson (LGW) Hamiltonian associated with n=4 type II fcc antiferromagnets is discussed. It is shown that the model is expected to exhibit a first-order transition in d=3 dimensions. Recent experimental results on CeS, CeSe and CeTe are discussed. (Atomindex citation 11:500885)

20M. Thermodynamics

JINR-13-12162 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Cryogenic Facility for Experimental Study on Liquid Helium Flows.
A. I. Ageev, V. F. Burinov, V. I. Pryanichnikov, and N. B. Rubin. 1979, 7p
In Russian.
U.S. Sales Only.

To investigate heat exchange and hydrodynamic processes during forced current of both two-phase and one-phase helium in extended channels, constructed is a facility consisting of a cryogenic magnet simulator, cryostat of cryogenic helium mains of 13.2 m length, vacuum system and testing instruments. The usage of renewable cryogenic simulators is envisaged: this permits the processes in various cryogenic systems to be simulated. Experimental data have shown, that at the values of heat flows existing in the acceleration-storage complex of HEPI (High-Energy Physics Institute) temperature difference between a wall and boiling helium is not over 0.05 K. Experimental values of hydraulic resistances in the range of mean values of vapour content $0.57 <= X <= 0.7$ are less by 30% than estimated values, obtained for homogeneous two-phase flows. No instability of helium flow current and heat exchange was observed. (Atomindex citation 11:502785)

N80-26634/9 PC **A03**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Environmental and Applied Fluid Dynamics Dept.

Comparison of Some Finite Difference Methods for the Prediction of Heat Transfer Phenomena in a Porous, Heat Producing Medium.
C. Benocci, and J. M. Buchlin. Sep 79, 46p VKI-TN-133
Prepared in Cooperation with Centre d'Etude de l'Energie Nucleaire, MOL, Belguim.

The testing of some advanced finite difference techniques for the prediction of natural convection in a porous, heat producing medium saturated by a liquid layer is discussed. This requires the solutions be of a set of nonlinear partial differential equations. Various step splitting methods are applied. Essentially, these are the 'alternate direction explicit and the alternate direction implicit methods. results are compared and discussed. It is shown that the explicit method is too slow for practical application, while alternate direction implicit techniques offer acceptable results. Thus, heat transfer phenomenology in packed beds is amenable to successful numerical study with reasonale machine times.

UCID-18602 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Finite Element Simulations of Thermally Induced Convection in an Enclosed Cavity.
C. D. Upson, P. M. Gresho, and R. L. Lee. Mar 80, 37p
Contract W-7405-ENG-48

The simulations reported establish benchmark comparisons of different techniques of solving the Navier-Stokes and thermal energy equations for a particular thermally driven flow. Included also is a brief analysis of the results and some comparisons with previous solutions. The second section of this paper contains a result at a higher Rayleigh number and some tilted cavity results, which were performed, in part, as potential candidates for more difficult follow-up benchmark problems. (ERA citation 05:022816)

20N. Wave Propagation

AD-A086 129/4 PC **A03**/MF **A01**
Pacific-Sierra Research Corp Santa Monica CA
ELF Propagation in the Presence of Nonstratified Ionospheric Disturbances.
Final rept. May 79-Feb 80,
E. C. Field, Jr., S. J. Gayer, and B. P. D'Ambrosio. Jun 80, 50p Rept no. PSR-1013
Contract N00014-79-C-0452
See also Rept. no. PSR-806, AD-A056 143 and Rept. no. PSR-904, AD-A066 097.

This report analyzes the propagation of the TEM-ELF waveguide mode when the ionosphere is not stratified. It treats strong localized ionospheric disturbances by recasting the lateral wave equation as a two-dimensional integral equation, and applies a specially developed algorithm to obtain numerical solutions. The quasi-full-wave results show that a localized ionospheric disturbance behaves like a converging cylindrical lens filling a narrow aperture. Lateral diffraction and focusing, ignored in treatments that do not fully account for transverse ionospheric structure, cause the ELF signal to exhibit a pattern of maxima and minima on the line normal to the path passing through the center of the disturbance. As expected, the focusing/diffraction effects diminish when the transverse dimension of the disturbance exceeds the width of the first Fresnel zone--typically, several megameters. The analysis models widespread inhomogeneities, such as within the polar cap or at the day/night terminator, as semiinfinite regions separated by diffuse boundaries; it then derives full-wave analytic expressions for the reflection of the TEM mode. Mode reflection is found to significantly affect an ELF signal in two actual situations: first, when receivers are on great circle paths that are nearly tangential to the disturbed polar cap--in which case shadow zones and interference patterns can occur; and second, when signals are incident on the day/night terminator (from the day side) at angles exceeding about 75 deg--in which case the signals are affected by a phenomenon analogous to total internal reflection. Reflection is found to be unimportant if the boundary thickness exceeds about one-sixth of a wavelength. (Author)

N80-26551/5 PC **A07**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group Microwaves.
On Microwave Measurement, Transmission and Reception.
J. Sneider. Dec 78, 138p PHL-1978-54

No abstract available.

N80-26577/0 PC **A03**/MF **A01**
Applied Physics Lab., Johns Hopkins Univ., Laurel, MD. Dept. of Space.
Cumulative Slant Path Rain Attenuation Associated with COMSTAR Beacon at 28.56 Ghz for Wallops Island, Virginia.
J. Goldhirsh. Aug 78, 33p NASA-CR-159997, APL/JHU-SIR78U-039
NASA ORDER S-50748-A

Yearly, monthly, and time of day fade statistics are presented and characterized. A 19.04 GHz yearly fade distribution, corresponding to a second COMSTAR beacon frequency, is predicted using the concept of effective path length, disdrometer, and rain rate results. The yearly attenuation and rain rate distributions follow with good approximation log normal variations for most fade and rain rate levels. Attenuations were exceeded for the longest and shortest periods of times for all fades in August and February, respectively. The eight hour time period showing the maximum and minimum number of minutes over the year for which fades exceeded 12 db were approximately between 1600 to 2400, and 0400 to 1200 hours, respectively. In employing the predictive method for obtaining the 19.04 GHz fade distribution, it is demonstrated theoretically that the ratio of attenuations at two frequencies is minimally dependent of raindrop size distribution providing these frequencies are not widely separated.

21. PROPULSION AND FUELS

21A. Air-Breathing Engines

PAT-APPL-6-161 257 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Improved Method for Driving Two-Phase Turbines with Enhanced Efficiency.
Patent Application,
D. G. Elliott. Filed 20 Jun 80, 11p N80-26660/4, NASA-CASE-NPO-15037-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method is disclosed for driving a two-phase turbine characterized by an output shaft having at least one stage including a bladed rotor connected in driving relation with the shaft. A two-phase fluid is introduced into the stage at a known flow velocity and caused to pass through the rotor in order to impart angular velocity. The speed of the rotor is controlled so that the angular velocity of the blade tips is equal to at least 50% of the velocity of the flow of the two-phase fluid.

21B. Combustion and Ignition

BARC-1020 PC **A03**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Modelling of Seed Droplet Evaporation in Combustion Products.
R. Sharma, N. Venkataramani, and V. K. Rohatgi. 1979, 35p
U.S. Sales Only.

The evaporation mechanism of stationary seed droplets of K sub 2 CO sub 3 in combustion products in combustion products has been investigated on the basis of a model (for droplet evaporation) which assumes that droplets have a size distribution depending on the type of atomizer used. Vapor pressure of K sub 2 CO sub 3 is also taken into account in evaluating evaporation temperature which is considerably lower than the boiling point of K sub 2 CO sub 3 . The formulae for the estimation of the time of evaporation are given. Finally, on the basis of the above model, process of droplet evaporation is analysed for a specific set of conditions. (Atomindex citation 11:498407)

CONF-800545-1 MF **A01**
Oak Ridge National Lab., TN.
Attrition and Elutriation Phenomena in Industrial Atmospheric Fluidized Bed Combustors.
J. W. Wells, and R. P. Krishnan. 1980, 6p
Contract W-7405-ENG-26
International powder and bulk solids conference and exhibition, Rosemont, IL, USA, 13 May 1980. Microfiche copies only.

Attrition and elutriation in large-scale AFBC systems depend on the design of the feed system, bed hydrodynamics and freeboard cooling. At present, no generalized correlation exists to predict these effects. It is suggested that routine solid samples for size analysis be taken before the solids enter the bed. In this way, correlations can be developed to predict the attrition in the feed system and in the bed separately. Secondly, data on the solids loading in the freeboard should be taken and related to bubble size, bubble velocity, bubble frequency and bed expansion. Such information can be obtained in a cold bed for lack of measuring techniques in hot beds. Accurate rate expressions for attrition and elutriation specific to coal ash, limestone, and char can then be developed to predict the performance of AFBC systems. (ERA citation 05:023559)

DOE/ET/10634-T1 MF **A01**
Germantown Labs., Inc., Philadelphia, PA.
Investigation of Fuels Containing Coal-Oil-Water Emulsions Fire Tube Test Apparatus. Tenth Quarterly Report, January 1, 1980-March 31, 1980.
N. H. Cherry, and C. S. Stokes. Jan 80, 12p
Contract AC22-77ET-10634
Microfiche copies only.

The fire tube test apparatus has been checked out and is ready for the combustion test series. The stack gas analysis equipment has been calibrated and operational procedures evaluated for data acquisition. In conjunction with the fire tube test apparatus, a commercial scale size Gaulin emulsifier (100 gallons/hour) has been set up and is presently under evaluation for the preparation of COM. (ERA citation 05:020023)

DOE/ET/13152-1 PC **A03**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Chemical Engineering.
Measuring and Modeling Solids Movement in a Large, Cold Fluidized Bed Test Facility. First Quarterly Report, 1 October, 31 December 1979.
T. J. Fitzgerald, R. V. Mrazek, and S. D. Crane. 1979, 28p
Contract AC01-79ET13152

Descriptions of new and redesigned instrumentation, including a system for direct measurement of solids movement, scaled inductor probes and a pneumatic-release magnetic-collection system are presented. Results of various tests conducted to determine the suitability and feasibility of each instrument as well as a comprehensive literature review are also included. (ERA citation 05:023560)

EPRI-FP-1199(V.1) MF **A01**
Brigham Young Univ., Provo, UT. Dept. of Chemical Engineering.
Mixing and Kinetic Processes in Pulverized Coal Combustors. Final Report.
L. D. Snoot. Oct 79, 268p
Microfiche copies only.

This project is a concurrent experimental and analytical effort to obtain a better technical understanding of the combustion of pulverized coal, including mixing processes, resulting chemical reactions, product yields, and pollutant formation processes. Understanding these combustion-related processes is essential if increasing reliability, safety and environmental requirements are to be satisfied through changes in coals and/or equipment based on demonstrated technical rationale. This project is an integral and supportive part of the Fossil Fuel Program's address to the coal-related reliability, safety, performance, and environmental problems of utility boilers. The investigators have developed a working relationship with major boiler manufacturer representatives to ensure that results of this study can find early application to practical utility systems. This is a final report on the

second phase of a technical study and describes the objectives, approach, and results of this thirteenth-month effort. (ERA citation 05:021723)

GA-A-15835 MF **A01**
General Atomic Co., San Diego, CA.
Improved Fluid Bed Combustor Efficiencies Through Fines Recycle.
W. S. Rickman. Apr 80, 10p CONF-800428-4
Contract AT03-76SF71053
International conference on fluidized bed combustion, Atlanta, GA, USA, 9 Apr 1980.
Microfiche copies only.

Carbon burnup efficiencies of 99.9% and higher have been attained on a 0.4-MW(t) atmospheric fluid bed combustor with fines recycle. A cyclone and sintered metal filter system separated the fines from the off-gas stream, returning them at 600 exp 0 C (1150 exp 0 F) to the fluid bed. The fines were metered through a unique rotary valve that also served as a pressure boundary between the fluid bed and the fines recycle hopper. Combustor operation was fully automated with a 100-channel process controller and supervisory computer. This high combustion efficiency is especially significant, since the fuel was graphite sized to less than 5 mm (1.3 in.) maximum size. More than 30% of the feed was fine enough to be quickly entrained, placing a substantial burden on the fines recycle system. Detailed modeling techniques were successfully developed to allow prediction of recycle rates and temperatures needed to maintain high combustion efficiency. This model has now been used to analyze coal combustion tests sponsored by Electric Power Research Institute. Surface reaction rate constants were first determined using combustor data taken during cold, low-flow fines recycle tests. These were then used to predict the effect of higher rates of recycle at various temperatures. (ERA citation 05:021726)

LIB-tr-4868 MF **A01**
Critical Conditions of Self-Ignition under Natural Convection.
K. V. Pribytkova, and E. A. Shtessel. 1978, 9p
A, Dokl. Akad. Nauk SSSR, 242 n4 P879-882 1978.
U.S. Sales Only. Microfiche copies only.

An attempt is made to characterize the joint effect of thermal and concentration convection on the thermal autoignition process. (ERA citation 05:021788)

21C. Electric Propulsion

N80-26384/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Spatial Motion Without Material Propulsion.
A. Fenioux. Mar 80, 10p NASA-TM-75933
Contract NASW-3199
Transl. into English from the French Patent (Appl. No. 79/18601, 18 Jul. 1979) p 1-7. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The retrograde system of a space vehicle is described which permits motion in space without the projection of gas by rotor or jet engine. It is composed of masses, which accelerate, decelerate and guide the center of gravity in space in an ordered actuation. The invention may be used to replace rotors and jet engines of our present space vehicles. In space, it may use electrical solar energy and develop indefinitely in the solar system.

21D. Fuels

AD-A085 843/1 PC **A06**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Construction Norms Straightened. Part II. Section G, Chapter 12, Gas Supply, Gas-Distributing Stations, Cylinder and Reservoir Settings up of the Liquefied Gas of the Norm of Design, SNIP II-G.12-65.
19 May 80, 117p Rept no. FTD-ID(RS)T-0429-80-PT-2
Unedited machine trans. of mono. Stroitel'nyye Normy i Pravila, Chast' II, Razdel G, Glava 12, Gazosnabzheniye, Gazorazdatochenyye Stantsii, Ballonnyye i Rezervuarnyye Ustanovki Szhizennogo Gaza, Normy Proektirovaniya, SNIP II-G.12-65, Moscow, 1966 p1-29.

No abstract available.

AESD-TME-3026 PC **A07**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
Second Phase of a Coalbed Methane Extraction and Utilization Program.
Apr 80, 140p
Contract AC21-78MC08332

The objective of this project is to demonstrate systems for economically extracting, collecting, and utilizing methane recovered from coalbeds. The results of this effort are intended to provide the economical and technical information necessary for implementation of expanded methane recovery operations by industry. This report covers the second phase of the project. The site on which the project is being conducted is an 850 acre tract of land owned by the Westinghouse Electric Corporation in Westmoreland County, Pennsylvania and known as the Waltz Mill Site. The objective of Phase II was to further explore the site to improve its definition as a methane fuel reservoir and to develop the design of a system capable of providing a large-scale demonstration of the recovery of coalbed methane and utilization of this resource in an industrial application, i.e., process heat and electric power. To meet the second phase objective, it was necessary to obtain cores for analysis from additional well sites, perform selective drill stem tests, define additional well locations based on test and analytical results, and incorporate these well locations into the system design for gas utilization. Three new wells were cored and drill stem testing was conducted on two of them. The Waltz Mill site has been evaluated as containing 7960 mcf of coalbed methane per acre. The producing well developed in the first phase of the project continued in operation except for brief periods of shutdown for equipment maintenance. The well has attained a peak flow rate of 85.3 mcf/day and an average daily flow rate in excess of 38 mcf. (ERA citation 05:021698)

ANL/ES-91 PC **A07**/MF **A01**
Argonne National Lab., IL.
Environmental Implications of Accelerated Gasohol Production: Preliminary Assessment.
Jan 80, 129p
Contract W-31-109-ENG-38

This report assesses the environmental impacts of increasing US production of fuel ethanol by 330 million gallons per year in the 1980 to 1981 time frame in order to substitute gasohol for 10% of the unleaded gasoline consumed in the United States. Alternate biomass feedstocks are examined and corn is selected as the most logical feedstock, based on its availability and cost. Three corn conversion processes that could be used to attain the desired 1980 to 1981 production are identified; fermentation plants that use a feedstock of starch and wastes from an adjacent corn refining plants are found to have environmental and economic advantages. No insurmountable environmental problems can be achieved using current technology; the capital and operating costs of this control are estimated. If ethanol production is increased substantially after 1981, the environmentally acceptable use or disposal of stillage, a liquid by-product of fermentation, could become a serious problem. (ERA citation 05:023832)

BMI-2031(V.3) PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Carbohydrate Crops as a Renewable Resource for Fuels Production. Volume III. Juice Preservation.
D. J. Fink, B. R. Allen, J. H. Litchfield, and E. S. Lipinsky. 29 Jan 80, 40p
Contract W-7405-ENG-92

The objective of this study was to evaluate a process to preserve sugar crop juices. The process is energy conserving in that concentrated sugar solutions are produced with little evaporation of water. A preliminary investigation was conducted of polysaccharide hydrolysis as a means for preserving mixed sugar solutions obtained from crops such as sweet sorghum. Four subtasks have been addressed during this report period: I. Concentration of Pure Sugar Solutions by Hydrolysis of Purified Starch; II. Concentration of Genuine Sugar Crop Juice by Hydrolysis of Purified Starch; III. Concentration of Pure Sugar Solutions by Hydrolysis of Genuine Biomass Starch; and IV. Concentration of Pure Sugar Solutions by Hydrolysis of Cellulosic Materials. The results obtained from the experiments conducted in Subtasks I and II included the following: (1) Concentrated sucrose-glucose-fructose solutions (greater than 50 percent) can be prepared from simulated or actual sweet sorghum juice using enzymatic thinning and saccharification of pure starch-sugar solution mixtures. (2) Enzymatic saccharification of corn meal and cracked wheat in simulated sorghum juice was also demonstrated. (3) Concentration of sugar solutions also can be accomplished by saccharification of cellulosic materials. In our experiments, inhibition of the cellobiase component of the cellulase preparation was observed. The hydrolysis studies were directed to the demonstration of the feasibility of one approach to the preparation of concentrated, microbiologically stable sugar syrups starting with sweet sorghum juice. Future work on Subtask V of this program will continue the investigations already underway and will consider other approaches to the stabilization of juices. Subtask VI of this program will consider the process economics of the Subtask I to IV approaches, or combinations of two or more methods, that are considered to be most feasible for juice preservation. (ERA citation 05:023833)

CONF-800303-18 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Peat Beneficiation and Its Effects on Dewatering and Gasification Characteristics.
M. C. Mensinger, S. A. Weil, D. V. Punwani, and M. J. Kopstein. 1980, 11p
Contract EX-76-C-01-1518
179. national meeting of the American Chemical Society, Houston, TX, USA, 23 Mar 1980.

Wet carbonization of Minnesota peat at temperatures and residence times in the ranges of 400 exp 0 to 600 exp 0 F and 0 to 80 minutes, respectively, increased the heating value of the solids from 8500 Btu/lb (dry basis) for the raw peat to between 9500 and 11,600 Btu/lb (dry basis). In the same range of operating conditions, mechanical dewaterability improves from about 80% moisture for the raw peat to between 41% and 27% moisture for the wet-carbonized peat. Wet carbonization of peat decreases the reactivity of peat char when compared with the char from raw peat. However, the reactivity of char from wet-carbonized peat is still significantly higher than that of char from bituminous coal. (ERA citation 05:021571)

CONF-800330-(Sum.) PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Pre-Proposal Conference for Model Cooperative Agreements. Program Solicitation for Proposals for Cooperative Agreements, Alternate Fuels Production.
31 Mar 80, 26p
Pre-proposal conference for model cooperative agreement, Washington, DC, USA, 31 Mar 1980.

This document contains a summarized and edited version of the question and answer proceedings regarding the solicitation document under PL 96-126, as well as accompanying supplemental questions and answers. A list of attendees is also included. (ERA citation 05:022515)

DOE/BETC/PPS-80/1 PC **A05**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Motor Gasolines, Summer 1979.
E. M. Shelton. Feb 80, 83p

Analytical data for 2401 samples of motor gasoline, from service stations throughout the country, were collected and analyzed under agreement between the Bartlesville Energy Technology Center and the American Petroleum Institute. The samples represent the products of 48 companies, large and small, which manufacture and supply gasoline. These data are tabulated by groups according to brands (unlabeled) and grades for 17 marketing areas and districts into which the country is divided. A map included in this report, shows marketing areas, districts and sampling locations. The report also includes charts indicating the trends of select-

ed properties of motor fuels since 1949. Twelve octane distribution percent charts for areas 1, 2, 3, and 4 for unleaded, regular, and premium grades of gasoline are presented in this report. The anti-knock (octane) index ((R + M)/2) averages of gasoline sold in this country were 88.6, 89.3, and 93.7 unleaded, regular, and premium grades of gasolines, respectively. (ERA citation 05:021787)

DOE/EV/02057-T2 PC **A07**/MF **A01**
Aerojet Energy Conversion Co., Sacramento, CA.
Study of Gelled LNG. Final Technical Report.
M. I. Rudnicki, J. A. Cabeal, L. C. Hoffman, R. A. Newton, and R. K. Schaplowsky. Jan 80, 148p
Contract EP-78-C-03-2057

Research involved the characterization of gelled LNG (GELNG) with respect to process, flow, and use properties and an examination of the degree of safety enhancement attainable by gelation. The investigation included (1) an experimental examination of gel properties and gel safety characteristics as well as (2) an analytical study involving the economics and preliminary design of an industrial scale gelation system. The safety-related criterion for successful application of gelled LNG is the substantial reduction of the Maximum Distance to the Lower Flammability Limit, MDLFL. This will be achieved by first, gel-inhibition of the hydrodynamic pooling and spreading of the spill, and second, the suppressed thermal transport properties of the GELNG relative to those of LNG. The industrial scale gelation study evaluated a design capable of producing 11,000 gallons (LNG tank truck) of gel in two hours. The increased cost of gelation using this equipment was estimated at $0.23/10 exp 6 Btu for plants with liquefaction facilities. The technical results of this study are supportive of the conclusion that gelation of LNG will reduce, relative to ungelled LNG, the hazard associated with a given size spill. Parameters of interest to the LNG facility operator (such as pumpability) are not significantly affected by gelation, and the impact on LNG delivery cost appears to be small, about 5%. Thus, the initial assumption that gelation would provide a practical means to enhance safety is supported by the results of this study. Larger scale, comparative spill tests of LNG and GELNG are now required to confirm the safety aspects of use of the gelled material. (ERA citation 05:021792)

FE-14801-3 PC **A06**/MF **A01**
Air Products and Chemicals, Inc., Allentown, PA.
Gas/Slurry Flow in Coal Liquefaction Processes (Fluid Dynamics in 3-Phase Flow Columns). Quarterly Technical Progress Report, October 1, 1979-31 December 1979.
D. H. S. Ying, R. Sivasubramanian, and E. N. Givens. Jan 80, 101p
Contract AC01-79ET14801

This work is a continuation of studies on the fluid dynamics of 3-phase flow to support the design of 6000 T/D dissolver in the SRC-I demonstration plant. Gas holdup in gas/liquid and gas/liquid/solid systems were investigated both in the presence and absence of liquid flow. The variables studied were: particle size (20/30 mesh and less than 100 mesh), solids concentration (0, 5, 11 and 12.7 lbs/ft exp 3), liquid velocity (0 to 0.05 ft/sec) and gas velocity (0.036 to 0.368 ft/sec). Gas holdup is found to be independent of liquid velocity which agrees with most investigators. At low superficial gas velocities (up to 0.10 ft/sec), the presence of solids did not change the gas holdup. However, at high gas velocities, only the presence of fine particles (less than 100 mesh) decreased holdup. The most severe reduction in holdup (13.9%) occurred at the highest gas velocity (0.368 ft/sec) and the highest solid concentration (11 lb/ft exp 3). The gas holdup data can be reasonably described by the correlation of Yoshida and Akita, except at the high concentration (11 lb/ft exp 3) of fine particles (less than 100 mesh). Liquid dispersion experiments were conducted in gas/liquid and gas/liquid/solid systems. All the three-phase experiments were done with 20/30 mesh sand. The variables studied were: liquid velocity (0.01 to 0.05 ft/sec), gas velocity (0 to 0.327 ft/sec) and solids concentration (5 and 20 lbs/ft exp 3). Liquid axial dispersion coefficients were independent of liquid velocity. Increasing gas velocity, however, increased the liquid dispersion coefficient. The presence of solid particles decreased the axial dispersion coefficient. Most of the correlations in the literature do not account for the presence of solids and fail to predict axial dispersion coefficients. The results indicate the need for a correlation that could account for the presence of solid particles. (ERA citation 05:021641)

FE-2030-TR-12 PC **A10**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Thermochemistry and Kinetics of Oxygen Interaction with Microporous Chars. Technical Report No. 12.
I. M. K. Ismail, and P. L. Walker. Jan 79, 220p
Contract EX-76-C-01-2030

In processes involving the hydrogasification of coal, the coal is first exposed to hydrogen at elevated temperatures and pressures during which devolatilization and gasification of the more reactive parts of the coal occur. A microporous coal char, which is relatively unreactive, is also produced. The char, in turn, can be reacted with steam to generate the hydrogen needed in the first part of the process. Or the char, in part, can be used in a boiler to raise steam. In any case, characterization of coal chars and the relation of character to behavior during gasification and/or combustion are important. This report is primarily concerned with laying the experimental base for the measurement of the heat of interaction of a gas (oxygen in this case) with chars. Following the laying of this base, using a char produced from a reproducible polymer system, heats of interaction of oxygen with chars produced from American coals, ranging in rank from anthracite to lignite, were measured. The combination of measuring heats of oxygen interaction with chars (using the DSC technique) and weight changes during the interaction opens up a valuable new technique to characterize coal chars. Heats of interaction at 100 exp 0 C are found to be related to rates of char gasification at higher temperatures. Both heats of interaction and gasification rates are, in turn, seen to increase sharply as the rank of coal from which the char is produced is decreased. (ERA citation 05:021607)

FE-2031-16 MF **A01**
University of Southern California, Los Angeles.
Chemistry and Structure of Coal Derived Asphaltenes and Preasphaltenes. Quarterly Progress Report, January-March 1980.
T. F. Yen. 1980, 64p
Contract EX-76-C-01-2031
Microfiche copies only.

The following conclusions are drawn: (1) the aromaticity of petroleum-derived asphaltene (f/sub a/ = 0.2-0.5) is lower than that of coal-derived asphaltene (f/sub a/ = 0.6-0.7). (2) The aromatic ring systems within petroleum-derived asphaltene are much more ccondensed (peri) (H/sub aru//C/sub ar/ = 0.3-0.5) than that of coal-derived asphaltene (kata)(H/sub aru//C/sub ar/ = 0.5-0.7). (3) The substituents of the petroleum-derived asphaltenes are longer (n = 4-6) than those of coal-derived asphaltenes (n = 1). (4) The aromatic system of petroleum-derived asphaltene is extensively substituted (70 to 80%), whereas the coal-derived asphaltene is sparingly substituted (35 to 45%). (5) The molecular weight of petroleum-derived asphaltene is ca. 10 times higher than that of the coal-derived asphaltene. (6) Petroleum-derived asphaltene is less reactive to physical or chemical agents than that of coal-derived asphaltene. (7) Petroleum-derived asphaltene is more highly associated (Me = 5-7) than that of coal-derived asphaltene (Me-2-4). This will be reflected in the ease of processing. (8) Petroleum-derived asphaltene is less poplar than the coal-derived asphaltene. (ERA citation 05:021635)

FE-2305-33 PC **A02**/MF **A01**
Gulf Research and Development Co., Pittsburgh, PA.
Investigation of Mechanisms of Hydrogen Transfer in Coal Hydrogenation. Quarterly Progress Report, January-March, 1979.
D. C. Cronauer, R. G. Ruberto, and D. C. Young. May 79, 16p
Contract EX-76-C-01-2305

The analytical approach to determine the conversion of coal and/or asphaltenes to pentane soluble product (oils) has been modified to limit co-solvent effects. Namely, the presence of aromatic solvents affects the determination of pentane solubles. The analytical approach used to determine the level of oils in products prepared in the 80 cc sand bath reactor has been described in the Phase II Annual Report (FE-2305-30). A similar procedure has been adapted to handle products from the 9 ml micro-reactor. Due to the charging of a small level of feed, typically 1.5 grams of asphaltenes or coal plus 3.5 grams of solvent, a stripping step has been substituted for the distillation step. To simulate products obtained during the initial stage of liquefaction, hydrogen transfer experiments were done with asphaltenes prepared from the low severity liquefaction of Kentucky 9/14 and Illinois No. 6 coals with SRC-II solvent. The preparation of these asphaltenes was carried out at mild liquefaction conditions of 375 and 400 exp 0 C at space times of 5 and 12 minutes. Specific details are outlined in Reports FE-2305-27 and -29 and in the Phase II Annual Report. The asphaltenes have been used in making an extensive number of hydrogen transfer experiments with various solvents, temperatures and reaction times. The runs were made in the 9 ml micro-reactor which is immersed in a heated sand bath. The average heat-up time is about 2.2 to 2.5 minutes. (ERA citation 05:021637)

FE-2306-32 PC **A03**/MF **A01**
Suntech, Inc., Marcus Hook, PA. Research and Engineering Div.
Research and Development of an Advanced Process for the Conversion of Coal to Synthetic Gasoline and Other Distillate Fuels. Quarterly Technical Progress Report No. 7, October-December 1978.
A. Schneider, E. J. Hollstein, E. J. Janoski, and E. G. Scheibel. Feb 79, 39p
Contract EX-76-C-01-2306

The present experimental work on the extraction of the coal liquids and the different distillate fractions has demonstrated that aqueous methanol is a practical solvent for separating the nitrogen and oxygen compounds in the naphtha and middle distillate boiling ranges. The naphtha hydrocarbons are lighter than the solvent and the middle distillate hydrocarbons, particularly those in the 85% higher boiling fraction, are heavier than the solvent and the best equipment performance will be obtained by extracting these fractions separately. Extractive distillation of the naphtha fraction and the 15% lowest boiling fraction of the middle distillate with a phenol solvent may be more economic than the solvent extraction of the lower density hydrocarbons. (ERA citation 05:021638)

FE-2306-35 PC **A03**/MF **A01**
Suntech, Inc., Marcus Hook, PA. Research and Engineering Div.
Research and Development of an Advanced Process for the Conversion of Coal to Synthetic Gasoline and Other Distillate Fuels. Quarterly Technical Progress Report No. 8, January 1979-March 1979.
A. Schneider, E. J. Hollstein, E. J. Janoski, and E. G. Scheibel. May 79, 45p
Contract EX-76-C-01-2306

We conclude from our present work that: (1) Continuous deep liquid extraction of coal liquids with DMF-heptane is entirely feasible. The use of DMF-heptane is more practical than aqueous methanol. (2) With the DMF-heptane system, the extraction can be tailored to remove any desired amount of coal liquids. (3) The extraction procedure as practiced with either DMF or aqueous methanol does not remove all basic nitrogenous material but successfully removes the phenolic material. (4) Attempts to hydrorefine the highly phenolic extract product cause the evolution of much methane at relatively low temperatures. (5) Catalytic hydrodenitrogenation and hydrodeoxygenation follow first order kinetics. (ERA citation 05:021639)

FE-2306-38 PC **A03**/MF **A01**
Suntech, Inc., Marcus Hook, PA. Research and Engineering Div.
Research and Development of an Advanced Process for the Conversion of Coal to Synthetic Gasoline and Other Distillate Fuels. Quarterly Technical Progress Report No. 9, April 1979-June 1979.
A. Schneider, E. J. Hollstein, E. J. Janoski, and E. G. Scheibel. Oct 79, 27p

Contract EX-76-C-01-2306

We carried out the fourth and fifth successful continuous dimethylformamide (DMF) - heptane extractions of SRC-II 350 exp 0 F+ Composite (SRC-II C). We have now tested four ratios of SRC-II C coal liquids, DMF, and heptane. The data confirm that we can operate the extraction column at suitable conditions to remove any desired amount of coal liquids as extract product. Countercurrent operation of the 33-stage, three inch, baffled, Scheibel extraction column gives exceptionally high throughputs with the DMF-heptane system. Analysis confirms that the basic nitrogen compounds are more difficult to extract than the oxygenated compounds, and neutral and acidic nitrogen compounds. We conclude from our present work that: (1) Liquid extraction of SRC-II C followed by hydrorefining is a unique and workable combination process which may prove to be economically attractive. (2) Countercurrent operation of the 33-stage, three-inch, baffled Scheibel extraction column gives exceptionally high throughputs on the DMF-heptane system. (3) The raffinate products of the 25 to 27% extractions contain 90 wt % aromatics, 0.4 wt % nitrogen and 0.3 wt % oxygen. (4) Hydrodenitrogenation of the raffinate product proceeds at a rate six times faster than non-extracted SRC-II C to yield a product possibly suitable as a hydrocracker or fluid catalytic cracker feed. (5) The extract products of the 25 to 27% extractions contain 8 wt % oxygen and 2.5 wt % nitrogen. (ERA citation 05:021640)

FE-2437-T1 MF **A01**
Adelphi Research Center, Inc., Garden City, NY.
Feasibility Study of Using a Coal/Water/Oil Emulsion as a Clean Liquid Fuel. Addendum to Final Report.
J. Dooher. Feb 80, 43p
Contract EX-76-S-01-2437
Microfiche copies only.

The main emphasis during this period was to compare the combustion, rheology, and settling of various concentrations of No. 6 oil emulsions and slurries with various average particle sizes of coal. We were able to burn only the No. 6 oil and a slurry of 40% coal, 60% oil with an average coal particle size anti x = 56.6 mu . Pendulum and viscosity data is presented on four different concentrations of coal, oil and water with four different particle size distributions. Infrared radiation tests were performed on No. 6 oil and a coal/No. 6 oil slurry, and for a comparison on No. 4 oil and a coal/No. 4 oil emulsion. (ERA citation 05:014751)

FE-2689-T1 PC **A03**/MF **A01**
Germantown Labs., Inc., Philadelphia, PA.
Investigation of Fuels Containing Coal-Oil-Water Emulsions: Emulsifier Evaluation. Sixth Quarterly Report, January 1, 1979-March 31, 1979.
N. H. Cherry, and C. S. Stokes. Apr 79, 50p
Contract EF-77-C-01-2689

The assessment of four different emulsifiers has been investigated. The stability of the emulsions determined by these four units has been evaluated by a K-scan unit. In all cases, stable emulsions have been produced containing 45% coal, 50% No. 6 Gulf oil, and 5% water mixtures. The production of 30% coal loaded mixtures with 65% No. 6 Gulf oil and 5% water was successful using a Gaulin homogenizer and a Sonic emulsifier. A detailed description of the parameters and operating conditions for producing the stable emulsions using the four different emulsifiers is presented. (ERA citation 05:021657)

FE-2689-4 PC **A02**/MF **A01**
Germantown Labs., Inc., Philadelphia, PA.
Investigation of Fuels Containing Coal-Oil-Water Emulsions. Fourth Quarterly Report, July 1, 1978-September 30, 1978.
N. H. Cherry, and C. S. Stokes. Oct 78, 15p
Contract EF-77-C-01-2689

The assessment of five emulsifiers for the production of stable coal-oil-water emulsions and the determination of the practicability of their use in a boiler system is being investigated. Four emulsifiers are on hand, the fifth is yet to be chosen. Ancillary equipment has been set up and experiments completed on two units. Mounting fixtures are being designed and fabricated for the third and fourth units. The stability of the emulsions is being evaluated on the K-scan unit. (ERA citation 05:021656)

FE-3240-T3 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Shift Conversion and Methanation in Coal Gasification: Bench-Scale Evaluation of a Sulfur Resistant Catalyst. Annual Progress Report, October 1, 1978-September 30, 1979.
J. G. McCarty, D. Meeker, and H. Wise. 19 Oct 79, 44p
Contract ET-78-C-01-3240

We have evaluated the methanation kinetics for a nickel-based catalyst promoted by the addition of 1 wt% iridium. The noble-metal promoter gives the catalyst superior activity and superior resistance to poisoning by sulfur compounds. We have compared the methanation activity and selectivity of the promoted and unpromoted catalysts under process conditions with a bench-scale internal recycle reactor. The rate data provide a basis for scale-up design and for evaluation of the resistance of the promoted catalyst to sulfur poisoning. Our results indicate that the Ir-promoted catalyst exhibits much higher methanation activity than the unpromoted catalyst (25 wt% Ni on Al sub 2 O sub 3). Methane formation rates on both catalysts vary in a similar manner with temperature and partial pressure of reactants, CO and H sub 2 . Since the ME kinetics for the Ir-promoted and unpromoted catalysts are similar, the promoted catalyst apparently has greater density of active ME sites per unit metal surface area. The promoted catalyst has much greater ME activity than the unpromoted catalyst following exposure to equal amounts of hydrogen sulfide gas per unit weight of catalyst. The activity of both sulfur poisoned catalysts declined but the activity of the promoted catalyst declined substantially less than the unpromoted catalyst. The influence of temperature and P/sub CO/ on the ME rates of the sulfur poisoned catalysts did not significantly differ from that of the sulfur-free catalysts. In a theroretical analysis we describe the rate data in terms of fundamental reaction steps involved in the overall methanation kinetics. (ERA citation 05:021611)

FE-3240-T5 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Shift Conversion and Methanation in Coal Gasification: Bench-Scale Evaluation of a Sulfur Resistant Catalyst. Quarterly Progress Report, January 1-March 31, 1980.
B. J. Wood, D. Sheridan, J. G. McCarty, C. M. Ablow, and H. Wise. 15 Apr 80, 18p
Contract ET-78-C-01-3240

The long-term bench-scale study described in the preceding quarterly report demonstrated the degree of improvement in specific methanation activity, lifetime, and sulfur resistance exhibited by the new iridium promoted nickel-on-alumina catalyst (Ir/Ni/Al sub 2 O sub 3) over a commercial catalyst (Ni/Al sub 2 O sub 3). However, quantitative interpretation of the results by measurements of H sub 2 S-breakthrough was obscured by the interaction of the particulate alumina diluent with the sulfur poison in the feed stream. To assess the magnitude of this perturbation by the diluent, a series of experimental measurements were performed in smaller reactors containing the catalyst samples without any diluent added to the catalyst bed. In these experiments the decline in the rates of methane production and CO conversion, and the appearance of H sub 2 S in the product stream were monitored. (ERA citation 05:021612)

GFETC/RI-80/2 PC **A02**/MF **A01**
Department of Energy, Grand Forks, ND. Grand Forks Energy Technology Center.
Effect of Operating Conditions on Production of Light Hydrocarbon Gases in Slagging Fixed-Bed Coal Gasification.
J. K. Olson, and H. H. Schobert. 1980, 9p

Light hydrocarbon gases - methane through butane - produced during the slagging fixed-bed gasification of lignites and subbituminous coals were determined by cryogenic oven gas chromatography using Chromsorb 102 columns. Changing gasification parameters to increase gas residence time, by increasing pressure or decreasing oxygen feed rate, increased the amount of these gases formed. The increased formation of the light hydrocarbons arose from breakdown of coal tars, since the additional amount of gaseous hydrocarbons corresponded well with an observed decrease in tar formation. (ERA citation 05:021614)

IEA-DT-084 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Contribution to the Study of Influencing Factor in Diameter Distribution of Diesel Oil in Aqueous Suspension.
P. A. S. Podiech. Nov 78, 50p
In Portuguese.Thesis.
U.S. Sales Only.

Based on published results the Author shows that: (1) it is possible, from the results obtained by means of the radiometric method, to determine the diameter distribution when 2<Re<=409; and (2) it is possible to correlate the parameter that defines the diameter distribution, the oil concentration and the impeller speed. From experiments carried out with three different fermenters, the author also shows that: (1) the air bubbling affected the diameter distribution, particularly in the tests carried out with relatively high oil concentration; (2) the drop size distribution was deeply affected by the treatment of the diesel oil by sulfuric acid; and (3) depending on the system geometry, the distance from the radiation detector to the tank bottom may affect the results. (Atomindex citation 11:500072)

LA-8225-PR PC **A08**/MF **A01**
Los Alamos Scientific Lab., NM.
Hydrogen Safety and Environmental Control Assessment. Progress Report, November 1, 1976-September 30, 1979. Final Report.
F. J. Edeskuty, J. R. Bartlit, R. V. Carlson, W. F. Stewart, and K. E. Cox. Apr 80, 156p
Contract W-7405-ENG-36

A proposed program has been developed to provide an ongoing assessment of hydrogen safety and environmental control. As hydrogen use and its public interactions continue to expand, new concerns are identified and old ones loom larger. These are here identified, together with a coordinated program for resolving them. The program contains elements of assessment and analysis in the following areas: hydrogen production methods, especially thermochemical and coal gasification processes; storage methods, including liquid, hydrides, high pressure gas, and gas in underground chambers; transport and transmission; end uses, including vehicular and space heating; and understanding the dispersion, ignition, and effects of large scale releases of gaseous or liquid hydrogen. Support for various recommendations are given in the appendixes. (ERA citation 05:021921)

LBL-10456 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Biomass Liquefaction Efforts in the United States.
S. Ergun. Feb 80, 23p
Contract W-7405-ENG-48

A brief summary of the biomass liquefaction research programs in the USA is presented. The facilities is Albany, Oregon and at LBL are described and flowcharts are included. The reactions occuring during these processes are explained. Properties of the oil produced are described. (ERA citation 05:021925)

N80-26531/7 PC **A05**/MF **A01**
Forskningsinstitutet for Atomfysik, Stockholm (Sweden).
Demonstration Plant for Methanol Production from Domestic Raw Materials.
1979, 93p NE-1979-5
Text in Swedish.

The techniques, markets and possible localization for a demonstration plant for methanol production from peat and biomass are reviewed. High temperature Winkler or Shell-Koppers gasification processes are preferred. Results indicate that the demonstration plant should have a capacity of 20 kton methanol/year and the investment cost is estimated to about 95 Mskr.

N80-26541/6 PC **A06**/MF **A01**
Deutsche Gesellschaft fuer Mineraloelwissenschaft und Kohlechemie e.V., Hamburg (Germany, F. R.).
Investigation of the Behavior of Menthanol as an Engine Fuel.
1979, 111p NP-24342, RR-45151
Text in German.

The use of methanol as a substitute fuel and as a mixing component for the dilution of Otto engine fuels was investigated. The results indicate that if methanol is to be used for the operation of Otto engines, vehicles must be adapted, and the supply system must be modified. For methanol/fuel mixtures, solutions to the important problem of demixing must be found.

N80-26542/4 PC **A08**/MF **A01**
Kernforschungsanlage, Juelich (Germany, F. R.).
Calculations and Analysis of Steam Methane Reforming Using High Temperature Reactor Heat.
H. Neis. Jul 79, 155p JUEL-SPEZ-48
Text in German.

The application of nuclear process heat for steam methane reforming as a modification of conventional technology was studied. A computer program was developed which allows the calculation of heat transfer to an extend heated tubular reactor in which the catalytic reactor takes place. Calculations for comparison with experimental data are in satisfactory agreement. A sensitivity analysis shows the influence of single model parameters on the computational results. From parametric studies design data for steam reformers were obtained which may serve as basis for project work of a process heat plant.

ORNL/MIT-302 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Oak Ridge, TN. School of Chemical Engineering Practice.
Determination of Price-Ratio Constraints on Synthetic Fuel Products.
V. W. S. Hwa, and W. K. Fraizer. Apr 80, 32p
Contract W-7405-ENG-26

The bounds on the relative priced of different fossil-fuel products were determined within a 20% accuracy by using the perspective of both the manufacturer and consumer. Methanol is too expensive for current fuel use and as a feedstock to the Methanol-to-Gasoline process for producing gasoline. Methane appears to be underpriced. For the processes considered, the interconversion costs from one fuel to another are highly dependent on the feedstock price and conversion efficiency, while the operating costs are relatively low. The results are strongly affected by the assumptions made and should be applied cautiously. (ERA citation 05:022516)

PAT-APPL-6-033 076 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Process for Changing Caking Coals to Noncaking Coals.
Patent Application,
J. L. Beeson. Filed 25 Apr 79, 15p
Contract EX-76-C-01-2307
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Caking coals are treated in a slurry including alkaline earth metal hydroxides at moderate pressures and temperatures in air to form noncaking carbonaceous material. Hydroxides such as calcium hydroxide, magnesium hydroxide or barium hydroxide are contemplated for slurrying with the coal to interact with the agglomerating constituents. The slurry is subsequently dewatered and dried in air at atmospheric pressure to produce a nonagglomerating carbonaceous material that can be conveniently handled in various coal conversion and combustion processes. (ERA citation 05:025250)

PAT-APPL-6-116 310 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Autocatalytic Coal Liquefaction Process.
Patent Application,
S. A. Qader. Filed 28 Jan 80, 31p N80-26460/9, NASA-CASE-NPO-14876-1
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved process is disclosed for liquefying coal in which coal minerals at high content are utilized as a hydrocracking catalyst. A slurry of 10 to 60% by weight of coal in recycled liquefied coal product which contains 15% to 30% by weight of coal minerals, is pressurized with excess hydrogen to a pressure of 2,000 to 4,000 psi and heated to a temperature of 450 to 550 C. The coal minerals autocatalytically convert coal solids to a low viscosity liquid product and to gas product in high yields while reducing oxygen, nitrogen and sulfur content of the coal product as compared to other coal liquefaction processes under development.

PB80-197098 PC **A04**/MF **A01**
Fiat Centro Richerche, Turin (Italy).
Potential of Diesel Engines, Fuels and Lubrication Technology.
Final rept.,
Giorgio Cornetti. Mar 80, 62p DOT-TSC-NHTSA-79-42, DOT-HS-805 241
Contract DOT-TSC-1424

The chemical and physical properties of diesel fuel are reviewed along with their relationships to the fuel economy and emissions of diesel powered automobiles and light trucks. The fuels considered include both conventional and alternative diesel fuels. Additives are surveyed and their impacts on combustion and overall engine performance are discussed. The fuel economy potential of future lubricants is investigated, particularly (1) upgraded mineral oils, (2) synthetic oils, and (3) colloidal suspension in mineral oils.

PB80-197874 PC **A02**/MF **A01**
Petroleum Conservation Research Association, New Delhi (India).
Use of Ethanol from Sugar Molasses as a Blending Component in Gasoline.
1979, 20p

This paper analyzes the possibilities and the various issues involved in the use of ethyl alcohol from sugar molasses as a blend component in gasoline in India.

PB80-203839 PC **A02**/MF **A01**
National Alcohol Fuels Commission, Washington, DC.
Alcohol Fuels Tax Incentives. A Summary: Alcohol Fuels Provisions of the Crude Oil Windfall Profit Tax Act.
Apr 80, 14p NAFC/80-02

This report contains a description of the alcohol fuels tax provisions contained in the Windfall Profit Tax Act, the most significant piece of Federal Tax Law affecting alcohol fuels.

PB80-203847 PC **A19**/MF **A01**
Office of Technology Assessment, Washington, DC.
Alternative Energy Futures. Part 1 - Background Reports. The Future of Liquefied Natural Gas Imports.
Mar 80, 435p
See also Rept. no. OTA-E-110, PB80-173552.

Contents: Future demand for gas--implications for LNG policy; North American oil and gas resources and production potential; Imported liquefied natural gas--projects, supply, consumption.

PB80-812993 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Gas: Supply, Demand and Utilization. 1978-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Jun 80,
Audrey S. Hundemann. Jul 80, 186p
Supersedes NTIS/PS-79/0702 and NTIS/PS-78/0621. See also 1964-1975, NTIS/PS-77/0573 and 1976-1977, NTIS/PS-79/0701.

Abstracts pertaining to natural gas supply and demand, industrial and residential consumption, fuel substitution, availability, costs, Government policies, and regulations are presented. Studies dealing with projections of natural gas use and the economics of supply and demand are included. (This updated bibliography contains 178 citations, 71 of which are new entries to the previous edition.)

PB80-813090 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Use as a Fuel. 1964-June, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Jun 80,
Audrey S. Hundemann. Jul 80, 214p
Updates NTIS/PS-75/379. Supersedes NTIS/PS-79/0779.

Federally-funded research studies pertaining to the technical feasibility of using hydrogen as a fuel for vehicular transportation, electric power generation, and both subsonic and supersonic aircraft are discussed. Excluded are studies on hydrogen production and storage. These topics are covered in other bibliographies. (This updated bibliography contains 206 citations, 20 of which are new entries to the previous edition.)

PETC/TR-80/3 PC **A03**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Comparison of Methods for the Determination of Asphaltenes, Oils and Insolubles. Part I. A Coal-Derived Liquid.
H. Schultz, and M. J. Mima. May 80, 41p

Five methods for the determination of asphaltenes, insolubles, and oils in coal-derived liquids were appraised by studying the data from replicate analyses by each method on the same coal hydrodesulfurization product. The results obtained were compared using Student's 't' test and statistically significant differences were found. In addition each method was evaluated for estimated production rate and required effort. The findings of the study suggest the need for a standardized procedure for the determination of these important parameters. (ERA citation 05:021661)

21E. Jet and Gas Turbine Engines

AD-A085 978/5 MF **A01**
Calspan Advanced Technology Center Buffalo NY Aerodynamic Research Dept
Numerical Studies of the Radiation Condition at the Inlet of a Transonic Compressor Blade Row.
Final rept. 26 Oct 78-25 Feb 80,
William J. Rae, and Gregory F. Hornicz. Apr 80, 37p Rept no. CALSPAN-6432-A-1
Contract N00019-78-C-0603
Availbility: Microfiche copies only.

Finite-difference calculations of the flow in a transonic compressor blade row were carried out, using a radiation boundary condition at a plane upstream of the blades. These results show essentially no difference from a comparable set that were done using a uniform-flow approximation as the inlet boundary condition. (Author)

AD-A086 049/4 PC **A05**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Soft Body Impact of Cantilever Beams.
Interim technical rept. Oct 77-Jul 79,
Jeffry D. Sharp. Mar 80, 76p Rept no. AFML-TR-79-4169

Damage incurred by gas turbine engine fan blades due to foreign object ingestion is of great concern to both manufacturers and the agencies that purchase such products. Of particular interest is the response of a structure impacted by a soft body, such as a bird. As a result, efforts have been made in the last several years to understand the dynamic behavior of blade-like structures under impact loading. A great deal of information is available concerning the hard body impact problem. However, the soft body impact problem has not yet been investigated as thoroughly. This study experimentally and analytically investigates the stress/time response of a cantilever beam subjected to impact loading from a soft object. Results from several different analytical models employing the Euler-Bernoulli Beam Theory are compared to experimental

data, and the validity of each model is assessed. The effects of structural damping, beam dimensions and the Timoshenko Theory parameters are discussed and conclusions as to their importance are drawn. It was determined that a cantilever beam impacted by a soft body can be accurately modeled as a forced vibration problem using the Euler-Bernoulli Theory and linear modal analysis wth damping. In addition, it was shown that large structures can be linearly scaled down for impact testing without affecting the results. (Author)

AD-A086 084/1 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Flow Quality for Turbine Engine Loads Simulator (TELS) Facility.
Final rept. 1 Oct 76-1 Sep 79,
R. J. Schulz. Jun 80, 38p Rept no. AEDC-TR-79-83
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A study was made to define the flow quality in air inlets used to support engine testing in the proposed Turbine Engine Loads Simulator Facility (TELS). The study showed that inlets could be designed that would produce separation-free flow for the worst case of crossflow induced by TELS rotation. The severity of recirculated exhaust gas ingestion by the inlet was estimated using a finite-difference numerical simulation of the engine and its exhaust deflector. Finally, a method was devised for defining the performance of a representative engine, the Pratt and Whitney F100 engine; the possible effects of inlet flow nonuniformity on engine performance in TELS were detailed. (Author)

AD-A086 128/6 PC **A07**/MF **A01**
Solar Turbines International San Diego CA
Complex, Precision Cast Columbium Alloy Gas Turbine Engine Nozzles Coated to Resist Oxidation.
Final rept. 2 Aug 76-2 Aug 79,
Lulu Hsu, W. G. Stevens, and A. R. Stetson. Apr 80, 150p SR80-R-4444-25, USAAVRADCOM-TR-80-F-2
Contract DAAG46-76-C-0053

The objectives of this program were to produce investment cast single vane nozzle segments in C129Y alloy (Nb-10Hf-10W-0.3Y) and to coat these vanes with the NS-4 (50W-20Mo-15Ti-10V) silicide coating. Initially, both cored and solid vane segments were specified but due to problems experienced in the consumable arc process, cored vanes were deleted from the program scope. Several problems developed. The electrode material supplied was low in yttrium, which might have contributed to the poor fluidity during arc melt and incomplete fill of thin walled sections. The solid nozzles and round test bars were acceptable and were used in coating processing and testing. Process specifications for both slurry spray and dip applications of the NS-4 modifier were prepared. Tensile and stress rupture tests of coated specimens displayed exceptional properties at elevated temperatures and showed superiority to cobalt-base vane alloys. Isothermal oxidation lives in excess of 5500 hours (at 760 and 1093 C) were exhibited by NS-4 coated C129Y specimens. In rig testing, under the severe thermal cycles and profiles imposed, the airfoil specimens typically survived about 100 hours.

AD-A086 130/2 PC **A07**/MF **A01**
General Electric Co Cincinnati OH Aircraft Engine Group
F101 Central Integrated Test Subsystem Evaluation.
Final technical rept. 2 Apr-31 Dec 79,
C. T. Vincent, and C. A. Arulf. Feb 80, 137p R79AEG622, AFWAL-TR-80-2002
Contract F33615-79-C-2022

Existing B-1/F101 flight data were used to determine the technical application and results of the diagnostic and monitoring systems utilized in the CITS. Contractor's analyses performed in support of the B-1 program provide the starting point for this program. The CITS functions investigated were (1) fault detection and isolation, (2) flight readiness status, (3) LCF and time at temperature counting, and (4) trend data acquisition. The data evaluation had four objectives: (1) Determine how well the B-1/F101 diagnostic and monitoring requirements/goals were met; (2) establish the rates of false indication; (3) categorize the maintenance actions taken on the basis of CITS inputs; and (4) determine the effectiveness of the trending program. In addition, the effectiveness of the F101 CITS parameter and data sampling rates was determined. Continuous recorded CITS data were used to evaluate usage tracking parameters and their effectiveness in determining maintenance actions. (Author)

AD-A086 170/8 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Development of a Noninterference Technique for Measurement of Turbine Engine Compressor Blade Stress.
Final rept. 1 Jul 76-30 Dec 78,
P. E. McCarty, and J. W. Thompson, Jr. Jun 80, 47p Rept no. AEDC-TR-79-78
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A noninterference technique for measuring stress in compressor blades of turbine engines is being developed to alleviate disadvantages associated with conventional strain-gage measurement systems. This technique utilizes blade tip deflection measurements and special data processing algorithms to infer local blade stress. A prototype noninterference processing system for inferring blade stress from a single compressor stage, from blade vibrations nonintegral to engine speed has been developed. Blade stress amplitude and spectral information are displayed on conventional strain-gage-type displays with which the blade stress analyst is intimately familiar. The prototype system has been checked by comparison with existing recorded strain-gage test data sampled to simulate blade tip deflection measurements. (Author)

DOE/NASA/0086-79/1 PC **A05**/MF **A01**
Energy Technology, Inc., Cleveland, OH.
Study of Advanced Radial Outflow Turbine for Solar Steam Rankine Engines.
C. Martin, and T. Kokenc. Dec 79, 76p NASA-CR-159695
Contract EX-77-A-29-1060

An analytical investigation was conducted to determine the performance characteristics of various steam Rankine engine confugurations for solar electric power generation. The analysis was based upon an advanced radial outflow steam turbine developed by Energy Technology, Incorporated. The range of interest for the study was defined by limiting the following parameters: turbine inlet temperature: 600 exp 0 F to 1300 exp 0 F; turbine inlet pressure: 400 PSIA to 2000 PSIA; conducting temperature: 65 exp 0 F to 130 exp 0 F; and power output: 100 kW to 5000 kW. The engine configurations analyzed resulted in Rankine cycle efficiencies from 25 percent to 44 percent not including losses. The effects of rotating equipment losses and auxiliary power requirements were analyzed to obtain engine efficiencies for a complete power conversion subsystem. Within the range of interest, the above losses resulted in engine efficiencies 9 to 17 percent less than the computed cycle efficiencies. Engine part load efficiency was found to decline uniformly until approximately 20 percent of full load, where the rate of decrease of engine efficiency increased significantly. ETI's steam turbine was investigated to determine: (1) a method for predicting performance from experimental data; (2) the pressure ratio; and, (3) the effect of varying the number of turbie stages. All turbine designs were restricted to be compatible with commercially available gear-boxes and generators. (ERA citation 05:022032)

N80-26274/4 PC **A03**/MF **A01**
Cincinnati Univ., OH.
A Calculation Procedure for Viscous Flow in Turbomachines, Volume 3.
I. Khalil, Y. Sheoran, and W. Tabakoff. Jun 80, 46p NASA-CR-159864
Contract NAS3-21609

A method for analyzing the nonadiabatic viscous flow through turbomachine blade passages was developed. The field analysis is based upon the numerical integration of the full incompressible Navier-Stokes equations, together with the energy equation on the blade-to-blade surface. A FORTRAN IV computer program was written based on this method. The numerical code used to solve the governing equations employs a nonorthogonal boundary fitted coordinate system. The flow may be axial, radial or mixed and there may be a change in stream channel thickness in the through-flow direction. The inputs required for two FORTRAN IV programs are presented. The first program considers laminar flows and the second can handle turbulent flows. Numerical examples are included to illustrate the use of the program, and to show the results that are obtained.

N80-26300/7 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial, Products Div.
Experimental Aerodynamic and Acoustic Model Testing of the Variable Cycle Engine (VCE) Testbed Coannular Exhaust Nozzle System.
D. P. Nelson, and P. M. Morris. 15 Jun 80, 83p NASA-CR-159710, PWA-5550-31
Contract NAS3-20061

Aerodynamic performance and jet noise characteristics of a one sixth scale model of the variable cycle engine testbed exhaust system were obtained in a series of static tests over a range of simulated engine operating conditions. Model acoustic data were acquired. Data were compared to predictions of coannular model nozzle performance. The model, tested with an without a hardwall ejector, had a total flow area equivalent to a 0.127 meter (5 inch) diameter conical nozzle with a 0.65 fan to primary nozzle area ratio and a 0.82 fan nozzle radius ratio. Fan stream temperatures and velocities were varied from 422 K to 1089 K (760 R to 1960 R) and 434 to 755 meters per second (1423 to 2477 feet per second). Primary stream properties were varied from 589 to 1089 K (1060 R to 1960 R) and 353 to 600 meters per second (1158 to 1968 feet per second). Exhaust plume velocity surveys were conducted at one operating condition with and without the ejector installed. Thirty aerodynamic performance data points were obtained with an unheated air supply. Fan nozzle pressure ratio was varied from 1.8 to 3.2 at a constant primary pressure ratio of 1.6; primary pressure ratio was varied from 1.4 to 2.4 while holding fan pressure ratio constant at 2.4. Operation with the ejector increased nozzle thrust coefficient 0.2 to 0.4 percent.

N80-26301/5 PC **A10**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Experimental Aerodynamic and Acoustic Model Testing of the Variable Cycle Engine (VCE) Testbed Coannular Exhaust Nozzle System: Comprehensive Data Report.
D. P. Nelson, and P. M. Morris. Jun 80, 225p NASA-CR-159711, PWA-5550-40
Contract NAS3-20061

The component detail design drawings of the one sixth scale model of the variable cycle engine testbed demonstrator exhaust syatem tested are presented. Also provided are the basic acoustic and aerodynamic data acquired during the experimental model tests. The model drawings, an index to the acoustic data, an index to the aerodynamic data, tabulated and graphical acoustic data, and the tabulated aerodynamic data and graphs are discussed.

N80-26302/3 PC **A08**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
CF6 Jet Engine Performance Improvement Program: High Pressure Turbine Aerodynamic Performance Improvement.
W. A. Fasching. Jul 80, 156p NASA-CR-159832
Contract NAS3-20629

The improved single shank high pressure turbine design was evaluated in component tests consisting of performance, heat transfer and mechanical tests, and in core engine tests. The instrumented core engine test verified the thermal, mechanical, and aeromechanical characteristics of the improved turbine design. An endurance test subjected the improved single shank turbine to 1000 simulated flight cycles, the equivalent of approximately

3000 hours of typical airline service. Initial back-to-back engine tests demonstrated an improvement in cruise sfc of 1.3% and a reduction in exhaust gas temperature of 10 C. An additional improvement of 0.3% in cruise sfc and 6 C in EGT is projected for long service engines.

N80-26326/2 PC **A02/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Technical Evaluation Report on the 54TH(B) Propulsion and Energetics Panel Meeting on Combustor Modelling.
D. Dryburgh, and R. B. Edelman. Mar 80, 20p
AGARD-AR-153, ISBN-92-835-1355-X
Meeting Held at Cologne, 3-5 Oct. 1979.

After a short introduction, the meeting papers are classified into categories concerning model elements, dimensionality, survey type, application and theoretical development. The first evaluation follows this classification, while other evaluations are related to the manufacturer's and the researcher's point of view. Conclusions and recommendations for future treatment of combustor modelling are presented.

N80-26448/4 PC **A11/MF A01**
Mechanical Technology, Inc., Latham, NY.
High Temperature Self-Lubricating Coatings for Air Lubricated Foil Bearings for the Automotive Gas Turbine Engine.
Final Report.
B. Bhushan. 1 Jul 80, 232p NASA-CR-159848, DOE/NASA/0043-2
Contracts DEN3-43, EC-77-A-31-1040

coating combinations were developed for compliant surface bearings and journals to be used in an automotive gas turbine engine. The coatings were able to withstand the sliding start/stops during rotor liftoff and touchdown and occasional short time, high speed rubs under representative loading of the engine. Some dozen coating variations of CdO-graphite, Cr2O3 (by sputtering) and CaF2 (plasma sprayed) were identified. The coatings were optimized and they were examined for stoichiometry, metallurgical condition, and adhesion. Sputtered Cr2O3 was most adherent when optimum parameters were used and it was applied on an annealed (soft) substrate. Metallic binders and interlayers were used to improve the ductility and the adherence.

N80-26632/3 PC **A03/MF A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Turbomachinery Dept.
Investigation of Transonic Steam Turbine Tip Sections with Various Suction Side Blade Curvatures.
C. C. H. Sieverding, R. Decuypere, and P. Hautot. Dec 78, 35p VKI-PREPRINT-1979-2
Submitted for Publication. Presented at Inst. Of Mech. Engr. Design Conf. On Steam Turbines for the 1980'S, London, Oct. 1979.

Theoretical and experimental results from studies of three transonic steam turbine rotor tip sections are presented. The aim is to evaluate the effect of various suction side curvatures on the blade performance at both design and off-design conditions. The experiments were conducted in a high speed cascade tunnel in the outlet Mach number range 0.8 to 1.7 with air as the working medium. The experiments included flow visualization tests using Schlieran photographs, detailed blade pressure distribution measurements, and blade performance measurements. The experimental blade velocity distributions and the outlet flow angles are compared with theoretical predictions obtained with a time marching method. Results confirm the usefulness of this time dependent finite area method in predicting performance of transonic blades. It is shown that any improvement of the design point performance by careful shaping of the suction side results in considerable reduction of the operating range.

N80-26662/0 PC **A11/MF A01**
Rocketdyne, Canoga Park, CA.
Small, High Pressure Liquid Hydrogen Turbopump.
Final Report, 7 Jun. 1977 - 26 Oct. 1979.
A. Csomor, and D. J. Warren. 23 May 80, 234p NASA-CR-159821, RI/RD79-322
Contract NAS3-21008

A high pressure, low capacity, liquid hydrogen turbopump was designed, fabricated, and tested. The design configuration of the turbopump is summarized and the results of the analytical and test efforts are presented. Approaches used to pin point the cause of poor suction performance with the original design are described and performance data are included with an axial inlet design which results in excellent suction capability.

N80-27160/4 PC **A08/MF A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Sound Radiation from a Finite Length Unflanged Circular Duct with Uniform Axial Flow.
K. Ogimoto. May 80, 172p UTIAS-231, CN-ISSN-0082-5255

In addition to the noise caused by the turbulent jet exhaust flow, the noise generated by the fans and compressors operating in the inlet duct is a dominant contributor to the overall jet aircraft engine noise. To assist in improving the understanding of the basic characteristics of this type of noise source, a general theory is developed using a simplified model. This model consists of a finite length hard wall unflanged circular duct, an arbitrary general planar source distribution in the duct and a uniform axial flow inside and outside the duct radius. The Wiener-Hopf-Technique, which is useful in solving mixed boundary value problems, was employed in the solution. The study by Williams of the scattering of plane waves by a finite length unflanged hollow cylindrical duct is particularly relevant. The plane wave in Williams' study is replaced by a general planar source distribution inside the duct. In addition, a uniform axial flow inside and outside the duct radius is also included. The model simulates a low thrust engine operating condition such as landing or steady flight and includes the diffraction of sound waves at the duct ends. However, the refraction effects due to the large nonuniform exterior flow fields, which are encountered near the inlet and exhaust under conditions of high thrust (i.e., at take-off) are excluded. The solution in the present work also includes the results of earlier studies with semi-infinite length unflanged circular ducts as a limiting case. However, the present finite length model provides a much improved simulation of the actual flow problem and it drastically changes the picture of the resulting sound radiation. The reasons for the changes are attributable to the resonance within the duct (leading to interior standing waves) and to the interference of the two sound waves radiated to the duct exterior from the duct ends.

PAT-APPL-6-149 792 PC **A02/MF A01**
Department of the Air Force Washington DC
Mixed Flow Augmentor Incorporating a Fuel/Air Tube.
Patent Application,
John M. Koshoffer. Filed 14 May 80, 19p AD-D007 365/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In a turbofan jet engine having a circumferentially rotatable mixer segment capable of orienting the afterburner ignitors and flameholders into the path of either the exhaust gases or by-pass air, a fuel-air transfer apparatus for capturing, transporting and the releasing of an enriched fuel-air concentration from the fuel spray bars, on the stationary structure of the jet engine, to the afterburner ignitors and flameholders rigidly attached at the rear of the rotatable segment of the mixer. The enriched fuel-air mixture is transported between a location of reliable fuel availability, through a region of highly turbulent gas flow and is thereafter released while still in an enriched concentration immediately upstream of the ignitors and flameholders, the facilitating ignition and sustained operation of the afterburner. The transfer of the fuel-air mixture with the exhaust gases in a confining apparatus precludes the necessity for transferring fuel, by flexible attachment or other means, between the stationary jet engine structure and the rotatable segment of the mixer, upon which the ignitors and flameholders are mounted, while insuring an appropriate fuel-air mixture for ignition and operation of the afterburner.

PATENT-4 199 003 Not available NTIS
Department of the Navy Washington DC
Flow Control System with Density Compensation.
Patent,
James S. Goldsmith. Filed 15 Dec 78, patented 22 Apr 80, 4p AD-D007 345/2, PAT-APPL-969 901
Supersedes PAT-APPL-969 901-78, AD-D006 013.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus for continuously measuring and correcting for fuel density in an aircraft engine fuel metering system. Fuel, sampled at the inlet to the engine metering valve, is fed through a flow regulator to a vortex spin chamber in which the fuel is tangentially injected. A magnetic ball carried by the fuel in a race integral with the vortex chamber generates an electrical pulse in an electromagnetic coil at a frequency proportional to the tangential velocity of the fuel. The pulse frequency is compared to a reference frequency and the error signal modulates the regulator to maintain the tangential velocity constant. The radial static differential pressure of the chamber is directly proportional to the fuel density. This signal provides a compensating signal to the fuel metering valve for correcting the mass flow rate of the fuel based on a known true volumetric flow rate. (Author)

21G. Reciprocating Engines

CONS-3288-T6 PC **A07/MF A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Performance of a Diesel Engine Operating on Raw Coal-Diesel Fuel and Solvent Refined Coal-Diesel Fuel Slurries. Final Report.
H. P. Marshall. Mar 80, 129p
Contract ET-78-S-01-3288

Performance tests using an 11 kW single cylinder diesel engine were made to determine the effects of three different micronized coal-fuel oil slurries being considered as alternative fuels. Slurries containing 20, 32, and 40%-wt micronized raw coal in No. 2 fuel oil were used. Results are presented indicating the changes in the concentrations of SO/sub X/ and NO/sub X/ in the exhaust, exhaust opacity, power and efficiency, and in wear rates relative to operation on fuel oil No. 2. The engine was operated for 10 h at full load and 1400 rpm on al fuels except the 40%-wt slurry. This test was discontinued because of extremely poor performance. (ERA citation 05:024335)

INIS-mf-4730 PC **A04/MF A01**
Norges Tekniske Hoegskole, Trondheim.
Radioactive Wear Tests of Four Cylinder Liner Materials.
G. Sylte. 7 Jul 76, 64p
U.S. Sales Only.

An investigation on the wear properties of various liner materials, financed by a research grant from NTNF (Royal Norwegian Council for Scientific and Industrial Research), is reported. The investigation was carried out by the Division of Internal Combustion Engines, Trondheim, Univ.,Norway, on a two-stroke, turbocharged, medium speed diesel engine (Wichmann 2ACAT, 280 by 420 mm). Thin pearlitic cast iron inserts of various compositions were pressed into the upper part of a specially machined cylinder liner. These inserts were activated in a nuclear reactor, and tracer techniques employed to measure the wear rate. Gas oil was used as a fuel throughout all tests. The insert technique employed, and the handling methods devised, were satisfactory. This part of the project must be characterised as being very successful. Originally, six different liner materials were specified, but due to misunderstandings duplications resulted in only four different materials finally being received at the laboratory. The engine tests disclosed that the wear rates of all four materials were low under laboratory conditions, and therefore difficult to measure accurately. Nevertheless, the wear properties of the inserts clearly fell into two distinct classes, which may be termed good and excellent. The relative values inside each group are, however, more uncertain due to the cumulative effects of errors,

instrument drift, measurement statistics, etc. (Atomindex citation 11:500081)

PAT-APPL-6-157 150 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Diesel Engine Catalytic Combustor System.
Patent Application,
L. W. Ream. Filed 6 Jun 80, 10p N80-26659/6, NASA-CASE-LEW-12995-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low compression turbocharged diesel engine is described in which the turbocharger can be operated independently of the engine to power auxiliary equipment. Fuel and air are burned in a catalytic combustor to drive the turbine wheel of the turbine section which is initially caused to rotate by the starter motor. By opening a flapper valve, compressed air from the blower section is directed to the catalytic combustor when it is heated and expanded, serving to drive the turbine wheel and also to heat the catalytic element. To start the engine, one valve is closed, combustion is terminated in the catalytic combustor, and another valve is then opened to utilize air from the blower for the air driven motor. When the engine starts, the constituents in its exhaust gas react in the catalytic element and the heat generated provides additional energy for the turbine section.

21H. Rocket Motors and Engines

PATENT-4 185 557 Not available NTIS
Department of the Navy Washington DC
Stress Reducing Liner and Method of Fabrication.
Patent,
Howard W. Gerrish, Jr. Filed 28 Apr 72, patented 29 Jan 80, 3p AD-D007 332/0, PAT-APPL-249 457
Supersedes PAT-APPL-249 457-72.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a stress reducing liner for a solid rocket motor comprising a first layer of polybutadiene based material, a second layer of perforated silicone rubber and a third layer of polybutadiene based material is fabricated by coating the inner surface of a rocket motor casing with a curable polybutadiene based first layer material, simultaneously heating and spinning the casing to cure the material in an even layer, placing perforated silicone rubber over the cured first layer, coating the silicone rubber layer with another uncured polybutadiene based material and repeating the simultaneous heating and spinning procedure. (Author)

21I. Rocket Propellants

AD-A086 104/7 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Development of General Form-Functions for Multiperforated Cylindrical Propellant Grains.
Final rept.,
Franz R. Lynn. Apr 80, 45p ARBRL-MR-03014, AD-E430 458

A method of constructing form-functions, algorithms yielding surface area and volume during burning, for arbitrary cylindrical multiperforated propellant grains is developed. Two FORTRAN subroutines embodying these procedures are provided for general use.

PATENT-4 187 676 Not available NTIS
Department of the Navy Washington DC
Bi-Metallic Thermal Compensator for Mounting and a Solid Propellant Grain.
Patent,
Scott M. O'Neil, and Howard H. Payne. Filed 13 Mar 78, patented 12 Feb 80, 4p AD-D007 334/6, PAT-APPL-885 706
Supersedes PAT-APPL-885 706-78, AD-D004 816.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A rocket assisted projectile is equipped with a bimetallic disk which changes shape to compensate for propellant grain growth or shrinkage with change in ambient temperature for maintaining the propellant in a predetermined position within the combustion chamber of the rocket. The disk is located in the combustion chamber forward of the propellant grain and bears against the chamber forward wall and the forward end of the grain. The effective thickness of the disk increases with reduced temperature so that the grain is maintained in solid contact with the base of the projectile to prevent excessive energy absorption upon firing of the projectile. (Author)

PATENT-4 193 952 Not available NTIS
Department of the Navy Washington DC
Extrusion of Solid Propellant Including Ammonium Perchlorate Whiskers.
Patent,
Arnold Adicoff, William G. Finnegan, William R. McBride, and William M. Ayres. Filed 4 May 72, patented 18 Mar 80, 2p AD-D007 338/7, PAT-APPL-250 407
Supersedes PAT-APPL-250 407-72.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 0.50.

This patent discloses a solid propellant formulation and method of preparation which has enhanced burning rate characteristics and improved mechanical properties. The formulation comprises a binder, a fuel and an inorganic oxidizer consisting of ammonium perchlorate whiskers which are oriented along the direction of shear. (Author)

PB80-808579 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Aluminized Propellants and Explosives. 1964-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1964-Apr 80,
Robert Hippler. May 80, 16p
Sponsored in part by National Technical Information Service, Springfield, VA.

The design, manufacture and use of aluminized propellants and explosives are the subject of the cited abstracts. Test data on the performance of these propellants and explosives are also given. Casting techniques, for insertion into the missile casing or other container, are described. (Contains 8 citations)

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A086 238/3 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Common Threads in the Aerospace Science Fabric,
Alfred Ritter, Norris M. Mendoza, Charles P. Pike, and George R. Seikel. 1980, 4p Rept no. AFGL-TR-80-0169
Pub. in 1980 Aerospace Sciences Meeting in Review, AIAA Aerospace Meeting (18th) Astronautics and Aeronautics, v18 n5 p43-45 May 80.

No abstract available.

N80-26337/9 PC **A04**/MF **A01**
Relay Development Corp., Branford, CT.
A Search for Experiments to Exploit the Space Shuttle Environment, Volume 1.
Final Report.
J. B. Fenn. 15 Dec 79, 70p NASA-CR-163030
Contracts NAS7-100, JPL-955578
2.

A search for worthwhile experiments in pure and applied physics and chemistry which might take advantage of conditions achievable aboard the space shuttle is documented. Of particular interest were the very large pumping speeds at high or ultra high vacuum, the highly nonequilibrium composition of the ambient atmosphere, and the relative absence of gravitational effects. Ideas and suggestions were solicated in the course of visits to 31 research establishments in Western Europe, India, and Japan; conversations with over 90 scientists; and presentations at 3 international meetings. Intriguing possibilities emerged in the following arenas: (1) spectroscopy of the transition state in chemical reactions; (2) flame structure and analysis; (3) solid propellant combustion; (4) analysis of atmospheric composition; (5) turbulence effects on aerosol coagulation.

N80-26338/7 PC **A03**/MF **A01**
Relay Development Corp., Branford, CT.
A Search for Experiments to Exploit the Space Shuttle Environment, Volume 2.
Final Report.
J. B. Fenn. 15 Dec 79, 32p NASA-CR-163031
Contracts NAS7-100, JPL-955578
2.

Institutions and laboratories in India, Japan, and Western Europe which were visited during a search for experiments to exploit the space shuttle environment are described. The facilities and current research interests of the various centers are discussed with particular emphasis given to the Indian Space Research Organization.

N80-26364/3 PC **A04**/MF **A01**
Martin Marietta Corp., Denver, CO.
Comet Nucleus Impact Probe Feasibility Study.
Final Report.
A. J. Castro. 15 Apr 80, 69p NASA-CR-152375, MCR-80-1002
NASA ORDER A-71116-B

A top level listing of the comet nucleus impact probe (CNIP) feasibility experiments requirements are presented. A conceptual configuration which shows that the feasibility of engineering the experiment is possible and describes the candidate hardware is discussed. The design studies required in order to design the operating experiment are outlined. An overview of a program plan used to estimate a rough order of magnitude cost for the CNIP experiment is given.

N80-26365/0 PC **A05**/MF **A01**
Rockwell International Corp., Downey, CA.
Space Platform Utilities Distribution Study.
A. E. Lefever. Jul 80, 84p NASA-CR-159272
Contract NAS1-15322

Generic concepts for the installation of power data and thermal fluid distribution lines on large space platforms were discussed. Connections with central utility subsystem modules and pallet interfaces were also considered. Three system concept study platforms were used as basepoints for the detail development. The tradeoff of high voltage low voltage power distribution and the impact of fiber optics as a data distribution mechanism were analyzed. Thermal expansion and temperature control of utility lines and ducts were considered. Technology developments required for implementation of the generic distribution concepts were identified.

N80-26366/8 PC **A09**/MF **A01**
Rockwell International Corp., Downey, CA. Space Operations and Satellite Systems Div.
Space Assembly Fixtures and Aids.
Final Report.
K. A. Bloom, and A. N. Lillenas. Jul 80, 198p
NASA-CR-159285, SSD-80-0021
Contract NAS1-15322

Concepts and requirements for assembly fixtures and aids necessary for the assembly and maintenance of spare platforms were studied. Emphasis was placed on erectable and deployable type structures with the shuttle orbiter as the assembly base. Both single and multiple orbiter flight cases for the platform assembly were considered. Applicable space platform assembly studies were reviewed to provide a data base for establishing the assembly fixture and aids design requirements, assembly constraints, and the development of representative design concepts. Conclusions indicated that fixture requirements will vary with platform size. Larger platforms will require translation rela-

tive to the orbiter RMS working volume. The installation of platform payloads and subsystems (e.g., utility distribution) must also be considered in the specification of assembly fixtures and aids.

N80-26371/8 PC **A05**/MF **A01**
British Aerospace Dynamics Group, Stevenage (England).
Pallet-Only Configuration Improvement Study-Rider: Technical Study.
Final Report.
B. Collins. Nov 79, 77p BAE-TPD-7761, ESA-CR(P)-1315
Contract ESA-3608/78

Two systems, (1) free-flying pallets connected to the NASA power module and (2) autonomous free-flying pallet, are examined in more detail. A background description of each system is given. Thermal control options are reviewed for the first system along with the feasibility of assembling longer pallet trains. For the second system aspects of the attitude and orbit control system, the thermal control system, and the command and data management system are considered. The study shows that Coastal Oceans Monitoring Satellite can be accommodated by the second system using a half-pallet.

N80-26372/6 PC **A10**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Table of Earth Satellites. Volume 3: 1974 to 1978.
J. A. Pilkington, D. G. King-hele, H. Hiller, and D. M. C. Walker. Jan 80, 220p RAE-TR-80001, RAE-SPACE-573

The 607 Earth satellite launches are arranged chronologically, giving the name and international designation of each instrumented satellite and its associated rocket(s), with the date of launch, lifetime (actual or estimated), mass, shape, dimensions and at least one set of orbital parameters. Other fragments associated with a launch are listed, without details.

N80-26374/2 PC **A11**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Technology Requirements for Future Earth-to-Geosynchronous Orbit Transportation Systems. Volume 2: Technical Results.
Final Report.
V. A. Caluori. Jun 80, 247p NASA-CR-3266
Contract NAS1-15301

Technologies either critical to performance of offering cost advantages compared to the investment required to bring them to usable confidence levels are identified. A total transportation system is used as an evaluation yardstick. Vehicles included in the system are a single stage to orbit launch vehicle used in a priority cargo role, a matching orbit transfer vehicle, a heavy lift launch vehicle with a low Earth orbit delivery capability of 226,575 kg, and a matching solar electric cargo orbit transfer vehicle. The system and its reference technology level are consistent with an initial operational capability in 1990. The 15 year mission scenario is based on early space industrialization leading to the deployment of large systems such as power satellites. Life cycle cost benefits in discounted and undiscounted dollars for each vehicle, technology advancement, and the integrated transportation system are calculated. A preliminary functional analysis was made of the operational support requirements for ground based and space based chemical propulsion orbit transfer vehicles.

N80-26377/5 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ATM-CMG Control System Stability.
W. W. Anderson, L. M. Avis, and K. L. Jacobs. May 80, 75p NASA-TM-81827

Stability analyses and simulation data and results are presented for an initial Control Moment Gyroscope system proposed for the Apollo Telescope Mount cluster (later named Skylab) using momentum vector feedback. A compensation filtering technique is presented which significantly improved analytical and simulation performance of the system. This technique is quite similar to the complementary filtering technique and represents an early NASA application.

N80-26378/3 PC **A08**/MF **A01**
California Univ., San Diego, La Jolla. Space Physics Group.
Active Experiments in Modifying Spacecraft Potential: Results from ATS-5 and ATS-6.
Final Report, May 1977 - Feb. 1979.
R. C. Olsen, and E. C. Whipple. Mar 79, 159p NASA-CR-159993, UCSD-SP-79-01
Contract NAS5-23481

The processing of data from onboard spacecraft instruments are described. The modification of spacecraft potentials is reviewed. Analysis of this data yielded the following results: (1) electron emission (E approxmiately 10 electron-volts) did not perturb the status of a satellite at low potential the absolute value of phi approximately 50 volts by more than 50 volts (the ATS 5 low energy limit), (2) emission of a low energy plasma (E approximatey 10 volts) does not change low potentials (the absolute value of phi approximately 5 volts) by more than a few volts (ATS 6 low energy resolution), (3) when ATS 6 entered eclipse in the presence of a high energy plasma (10 keV), the neutralizer suppressed any rise in the absolute value of phi (within a few volts resolution), (4) when the electron emitter on ATS 5 operated, it served to discharge negative potentials from thousands to hundreds of volts, and (5) when the neutralizer on ATS 6 was operated, it served to discharge kilovolt potentials to below 50 volts. Low altitude (100 - 300 km) experiments with KV electron beams are studied. Differential charging was eliminated by the operation of the main thruster on ATS 6 clamped on the spacecraft at -5 volts.

N80-26410/4 PC **E03**/MF **A01**
Illinois Univ. at Urbana-Champaign, Urbana.
Effect of a Zero G Environment on Flammability Limits as Determined Using a Standard Flammability Tube Apparatus.
Final Report.
R. A. Strehlow, and D. L. Reuss. Jun 80, 30p NASA-CR-3259
Grant NSG-3043
Document Includes a Microfiche Supplement.

Flammability limits in a zero gravity environment were defined. Key aspects of a possible spacelab experiment were investigated analytically, experimentally on the bench, and in drop tower facilities. A conceptual design for a spacelab experiment was develcped.

22B. Spacecraft

AD-A085 816/7 PC **A04**/MF **A01**
Charles Stark Draper Lab Inc Cambridge MA
ACOSS Four (Active Control of Space Structures) Theory. Volume II. Appendix.
Final technical rept. 24 Jul 78-31 Dec 79,
Robert R. Strunce, Daniel R. Hegg, Jiguan G. Lin, and Timothy C. Henderson. Apr 80, 64p R-1338-VOL-2, RADC-TR-80-78-VOL-2
Contract F30602-78-C-0268, ARPA Order-3654
See also Volume 1, AD-A085 654.

This is the Charles Stark Draper Laboratory, Inc., final technical report on its Actively Controlled Structures Theory Study. The objective of the research reported here was to develop the theoretical and analytical tools to support the successful implementation of active vibration control of large flexible spacecraft. Parallel efforts in theory and applications were initiated. For the theoretical effort, several representative design methods were selected for careful study focusing on an examination of the theoretical basis for each method and potential difficulties associated with their use in reduced-order large space structure controller design. The methods initially selected are characterized by constant-gain output feedback, the simplest form of active multivariable control; (1) Modal Decoupling, (2) Pole Assignment, (3) Optimal Output Feedback, (4) Suboptimal Output Feedback, and (5) Stochastic Optimal Output Feedback. A performance comparison of specific designs with these methods was made. Extensions to the published Kosut methods of suboptimal output feedback are developed, as well as the details of an algorithm necessary for a numerical solution. Techniques and conditions are developed for reduction of control (observation) spillover by placement of actuators (sensors), by synthesis of the actuator (sensor) influences, and by compensation of actuators (sensors).

AD-A086 195/5 PC **A04**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Space Shuttle Orbiter SILTS Pod Flow Angularity and Aerodynamic Heating Tests (OH-102A and OH-400).
Final rept. Oct 78-Oct 79,
K. W. Nutt. Nov 79, 52p Rept no. AEDC-TSR-79-V70
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Heat transfer, flow field, and oil flow tests were conducted on a 0.0175 scale model of the space shuttle orbiter. The tests were conducted at Mach 8. The objective of the tests was to determine the aerodynamic heating distribution on the orbiter SILTS tail configuration and to obtain flow field total pressure and total temperature measurements at the location of the leading edge of the vertical tail. The tests were conducted at free-stream Reynolds numbers ranging from 0.5 to 3.7 million per ft. The model angle of attack was varied from -5 to 5 deg and from 30 to 40 degrees.

N80-26370/0 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F. R.). Inst. fuer Kernenergetik und Energiesysteme.
Lifetests of Telecommunications Satellite Heat Pipes.
Final Report.
W. D. Muenzel. Jan 79, 81p ESA-CR(P)-1312
Contract ESA-1857/73-JS

The life testing of low temperature heat pipes designed for satellite thermal control is discussed. Five stainless steel/ammonia artery heat pipes and four aluminum/ammonia artery heat pipes were operated at elevated temperatures of about 60 C with a heat load of 15 watts for each pipe. In addition, two axially grooved aluminum/ammonia heat pipes operating at 60 C with a heat load of 50 watts, each were tested. Major results obtained from controlled maximum performance tests are compiled. Moreover, the results of some mechanical tests, burst pressure tests, and a post-mortem analysis of one of the aluminum artery heat pipes are included. Life testing of stainless steel heat pipes indicates no signs of deterioration over a period of three years. The aluminum heat pipes develop a steadily increasing amount of non condensible gas. However, life testing of axially grooved aluminum heat pipes show that the small amounts of non condensible gas generated after a period of nearly one year, produce little effect on the heat transport characteristics of these pipes.

N80-26373/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Thermal Performance of a Mechanically Attached Ablator Tile for on-Orbit Repair of Shuttle Tps.
S. S. Thompkins, C. M. Pittman, and A. B. Stacey, Jr.. May 80, 51p NASA-TM-81822

The reusable surface insulation (RSI) material used in the shuttle thermal protection system is susceptible to damage. If any RSI tiles are damaged or lost during ascent, they must be repaired or replaced prior to entry. One approach to replacing a damaged or missing RSI tile consists of mechanically attaching a tile of ablation material in the place of the RSI tile. The thermal performance of this type of repair tile was evaluated in a simulated entry heating environment. The test specimen consisted of the ablator repair tile mechanically fastened to the strain isolation pad and surrounded by RSI tiles. The evaluation of the thermal performance was based on temperature response, surface integrity, and predicted flight performance. When the ablator tile protruded 1/8 inch above the surrounding RSI tiles, the forward facing steps caused significant inflow of hot gas down the ablator RSI joints and this inflow caused greatly increased back surface temperatures.

N80-26376/7 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena CA.

Discussion Meeting on Gossamer Spacecraft (Ultralightweight Spacecraft).
Final Report.
R. G. Brereton. 15 May 80, 186p NASA-CR-163275, JPL-PUB-80-26
Contract NAS7-100
Meeting Held at Pasadena, Calif., 19-20 Dec. 1979.

Concepts, technology, and application of ultralightweight structures in space are examined. Gossamer spacecraft represented a generic class of space vehicles or structures characterized by a low mass per unit area (approximately 50g/m2). Gossamer concepts include the solar sail, the space tether, and various two and three dimensional large lightweight structures that were deployed or assembled in space. The Gossamer Spacecraft had a high potential for use as a transportation device (solar sail), as a science instrument (reflecting or occulting antenna), or as a large structural component for an enclosure, manned platform, or other human habitats. Inflatable structures were one possible building element for large ultralightweight structures in space.

N80-26379/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Without Tables of Ranks and the Iskra Student Design Bureau.
N. Grigoryeva, and B. Pankratov. Jul 80, 18p
NASA-TM-76277
Contract NASW-3198
Transl. Into English from 'Bez Tabeli O Rangakh' and 'Skb Iskra', Radio (USSR), No. 1, Jan. 1979 p 9-12. Transl. By Scientic Translation Service, Santa Barbara, Calif.

No abstract available.

N80-26395/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Uniaxial and Biaxial Tensioning Effects on Thin Membrane Materials.
W. F. Hinson, and J. W. Goslee. Jun 80, 25p
NASA-TM-81812

Thin laminated membranes are being considered for various surface applications on future large space structural systems. Some of the thin membranes would be stretched across or between structural members with the requirement that the membrane be maintained within specified limits of smoothness which would be dictated by the particular applications such as antenna reflector requirements. The multiaxial tensile force required to maintain the smoothness in the membrane needs to be determined for use in the structure design. Therefore, several types of thicknesses of thin membrane materials have been subjected to varied levels of uniaxial and biaxial tensile loads. During the biaxial tests, deviations of the material surface smoothness were measured by a noncontacting capacitance probe. Basic materials consisted of composites of vacuum deposited aluminum on Mylar and Kapton ranging in thickness from 0.00025 in (0.000635 cm) to 0.002 in (0.00508 cm). Some of the material was reinforced with Kevlar and Nomex scrim. The uniaxial tests determined the material elongation and tensile forces up to ultimate conditions. Biaxial tests indicated that a relatively smooth material surface could be achieved with tensile force of approximately 1 to 15 Newtons per centimeter, depending upon the material thickness and/or reinforcement.

N80-26604/2 PC **A05**/MF **A01**
Boeing Aerospace Co., Seattle, Wash.
Ground/Bonding for Large Space System Technology (LSST).
Final Report.
W. G. Dunbar. Apr 80, 93p NASA-CR-161486
Contract NAS8-33432

The influence of the environment and extravehicular activity remote assembly operations on the grounding and bonding of metallic and nonmetallic structures is discussed. Grounding and bonding philosophy is outlined for the electrical systems and electronic compartments which contain high voltage, high power electrical and electronic equipment. The influence of plasma and particulate on the system was analyzed and the effects of static buildup on the spacecraft electrical system discussed. Conceptual grounding bonding designs are assessed for capability to withstand high current arcs to ground from a high voltage conductor and electromagnetic interference. Also shown were the extravehicular activities required of the space station and or supply spacecraft crew members to join and inspect the ground system using manual on remote assembly construction.

N80-27158/8 PC **A09**/MF **A01**
Wyle Labs., Inc., Huntsville, Ala. Scientific Services and Systems Group.
Analysis of SRB Reentry Acoustic Environments.
Final Report.
T. Coffin, R. E. Dandridge, and U. W. Haddock.
Jun 79, 185p NASA-CR-161476, WR-79-15
Contract NAS8-32112

Space shuttle solid rocket booster reentry aeroacoustic environments were estimated. Particular emphasis was given to the aft skirt/exit plane region for the Mach number regime 0.6 = or greater than M infinity = or less than 3.5. The analysis is based on the evaluation of wind tunnel model results in conjunction with Monte Carlo simulation of trajectory parameters. The experimental approach is described as well as the evaluation process utilized. Predicted environments are presented in terms of one-third octave band spectra representing space averaged values for critical regions on the solid rocket booster.

22C. Spacecraft Trajectories and Reentry

N80-26339/5 PC **A05**/MF **A01**
Analytical and Computational Mathematics, Inc., Houston, TX.
Mission Analysis Data for Inclined Geosynchronous Orbits, Part 1.
O. F. Graf, Jr., and K. C. Wang. May 80, 81p
NASA-CR-160702, ACM-TR-121-PT-1
Contract NAS9-15883

Data needed for preliminary design of inclined geosynchronous missions are provided. The inertial and Earth fixed coordinate systems are described, as well as orbit parameters and elements. The complete family of geosynchronous orbits is discussed. It is shown that circular inclined geosynchronous orbits comprise only one set in this family. The major orbit perturbation and their separate effects on the geosynchronous orbit are discussed. Detailed information on the orbit perturbation of inclined circular geosynchronous orbits is given, with emphasis on time history data of certain orbital elements. Orbit maintenance delta velocity (V) requirements to counteract the major orbit perturbations are determined in order to provide order of magnitude estimates and to show the effects of orbit inclination on delta V. Some of the considerations in mission design for a multisatellite system, such as a halo orbit constellation, are discussed.

N80-26340/3 PC **A03**/MF **A01**
Analytical and Computational Mathematics, Inc., Houston, TX.
Mission Analysis Data for Inclined Geosynchronous Orbits, Part 2. Appendix A: Bibliography.
May 80, 50p NASA-CR-160703, ACM-TR-121-PT-2-APP-A
Contract NAS9-15883

A bibliography of papers and reports on geosynchronous orbits, as well as background papers concerned with the fundamentals of orbital mechanics is presented. A listing of computer programs developed for this study is included.

N80-26368/4 PC **A05**/MF **A01**
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
A Review of Satellite Lifetime and Orbit Decay Prediction.
J. Delafontaine, and S. C. Garg. Jun 80, 81p
UTIAS-43, ISSN-0082-5247
Sponsored by Canada Dept. Of Communication.

The modelling and the methods necessary to predict satellite lifetimes are reviewed. Orbital perturbations, models for Earth's potential field, lunisolar attraction and atmospheric drag are considered. Static and dynamic density models are presented. Satellite properties (projected area and drag coefficient) are discussed. Analytical methods for using these models are examined and compared with other methods. The state of the art is assessed and areas requiring more research are identified.

22D. Spacecraft Launch Vehicles and Ground Support

N80-26341/1 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
The Telecommunications and Data Acquisition Report.
Progress Report, Mar. - Apr. 1980.
15 Jun 80, 176p NASA-CR-163249, JPL-PUB-42-57
Contract NAS7-100

No abstract available.

N80-27108/3 PC **A04**/MF **A01**
Computer Sciences Corp., Houston, TX.
Preliminary Mathematical Specifications for Area Targets and Space Volumes.
M. Bishop. Mar 79, 74p NASA-CR-160192, CSC-0229
Contract NAS9-15700

The preliminary level B/C mathematical specifications for the Mission Control Center (MCC) area targets and space volumes processor are presented.

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